Maintenance and Service Guide

HP Compaq Notebook nc4000 Series

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May 2003

This troubleshooting reference is used for maintaining and servicing the notebook. The guide provides comprehensive information on identifying notebook features, components, and spare parts, troubleshooting notebook problems, and performing notebook disassembly procedures.

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Maintenance and Service Guide
HP Compaq Notebook nc4000 Series
First Edition May 2003
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Product Description

The HP Compaq Notebook nc4000 Series of personal notebooks offer advanced modularity, Intel Mobile Pentium-M processors with 64-bit architecture, industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support.

HP Compaq Notebook nc4000 Series

1.1 Models

Notebook models are shown in Tables 1-1 and 1-2.

Table 1-1
HP Compaq Notebook nc4000 Model Naming Conventions

Key									
Cnc4000	P	160	X2	60	0	C/C	51	O	XXXXXX-XXX
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Key	Description	Options	
1	Brand/Series designator	C = Compaq	nc4000 = nc4000
2	Processor type	P = Intel Pentium-M	
3	Processor speed	160 = 1.6 GHz 150 = 1.5 GHz	140 = 1.4 GHz 130 = 1.3 GHz
4	Display type/ size/resolution	X = XGA (1024 × 768)	2 = 12.x in
5	Hard drive size	60 = 60 GB 40 = 40 GB	30 = 30 GB
6	Optical drive designator	N = None	
7	Integrated communication/ wireless device	G = Combination modem and GB NIC M = Modem N = None	d = 802.11a/b/g c = 802.11b/g j = 802.11b/g + Bluetooth m = 802.11a/b/g + Bluetooth N = none p = Bluetooth
8	RAM	51 = 512 MB	25 = 256 MB
9	Operating system	2 = Windows 2000	O = Windows XP Pro
10	SKU#		

Table 1-2
HP Compaq Notebook nc4000 Models

All HP Compaq Notebook nc4000 models use configuration code **LN5Z** and feature:

- Dual point pointing device (TouchPad and pointing stick)
- 6-cell, 4.0 wH lithium ion (Li ion) battery pack
- 3-year warranty on parts and labor

Cnc4000	P	160	X2	40	N	G/d	51	O	
French Canada			DG987A ABC			United States			DG987A ABA
Cnc4000	P	160	X2	40	N	G/d	51	2	
French Canada			DG988A ABC			United States			DG988A ABA
Cnc4000	P	150	X2	60	N	G/m	51	O	
Asia Pacific			DG994A UUF			Japan			DG994A ABE
France			DG994A ABF			United States			DG994A ABA
Italy			DG994A ABz						
Cnc4000	P	150	X2	40	N	G/j	51	O	
Belgium			DG991A UUG			The Netherlands			DG991A ABH
Denmark			DG991A ABY			Norway			DG991A ABN
Europe			DG991A ABB			Portugal			DG991A AB9
France			DG991A ABF			Spain			DG991AABE
Germany			DG991A ABD			Sweden/Finland			DG991A AK8
Greece			DG991A AB7			Switzerland			DG991A UUZ
Italy			DG991A ABZ			United Kingdom			DG991A ABU
Cnc4000	P	150	X2	40	N	G/j	51	2	
Belgium			DG992A UUG			The Netherlands			DG992A ABH
Denmark			DG992A ABY			Norway			DG992A ABN
Europe			DG992A ABB			Portugal			DG992A AB9
France			DG992A ABF			Spain			DG992AABE
Germany			DG992A ABD			Sweden/Finland			DG992A AK8
Greece			DG992A AB7			Switzerland			DG992A UUZ
Italy			DG992A ABZ			United Kingdom			DG992A ABU

Table 1-2
HP Compaq Notebook nc4000 Models *(Continued)*

Cnc4000	P	150	X2	40	N	G/c	25	O	
Asia Pacific			DG993A UUF			Japan			DG993A ABJ
France			DG993A ABF			Spain			DG993A ABE
Germany			DG993A ABD			United States			DG993A ABA
Italy			DG993A ABZ						
Cnc4000	P	140	X2	40	N	G/N	25	O	
Asia Pacific			DG244A UUF			Latin America			DG244A ABM
Australia			DG244A ABG			The Netherlands			DG244A ABH
Belgium			DG244A UUG			Norway			DG244A ABN
Brazil			DG244A AC4			People's Republic of China			DG244A AB2
Czech Republic			DG244A AKB			Poland			DG244A AKD
Denmark			DG244A ABY			Portugal			DG244A AB9
Europe			DG244A ABB			Russia			DG244A ACB
France			DG244A ABF			Saudi Arabia			DG244A ABV
French Canada			DG244A ABC			Slovenia			DG244A AKN
Germany			DG244A ABD			Spain			DG244A ABE
Greece			DG244A AB7			Sweden/Finland			DG244A AK8
Hong Kong			DG244A AB5			Switzerland			DG244A UUZ
Hungary			DG244A AKC			Taiwan			DG244A AB0
Iceland			DG244A A2M			Thailand			DG244A AKL
India			DG244A ACJ			Turkey			DG244A AB8
Israel			DG244A ABT			United Kingdom			DG244A ABU
Italy			DG244A ABZ			United States			DG244A ABA
Japan			DG244A ABK						
Japan (English)			DG244A ACF						
Korea			DG244A AB1						

Table 1-2
HP Compaq Notebook nc4000 Models *(Continued)*

Cnc4000	P	140	X2	40	N	G/N	25	2	
Asia Pacific			DG245A UUF			Latin America			DG245A ABM
Australia			DG245A ABG			The Netherlands			DG245A ABH
Belgium			DG245A UUG			Norway			DG245A ABN
Brazil			DG245A AC4			People's Republic of China			DG245A AB2
Czech Republic			DG245A AKB			Poland			DG245A AKD
Denmark			DG245A ABY			Portugal			DG245A AB9
Europe			DG245A ABB			Russia			DG245A ACB
France			DG245A ABF			Saudi Arabia			DG245A ABV
French Canada			DG245A ABC			Slovenia			DG245A AKN
Germany			DG245A ABD			Spain			DG245A ABE
Greece			DG245A AB7			Sweden/Finland			DG245A AK8
Hong Kong			DG245A AB5			Switzerland			DG245A UUZ
Hungary			DG245A AKC			Taiwan			DG245A AB0
Iceland			DG245A A2M			Thailand			DG245A AKL
India			DG245A ACJ			Turkey			DG245A AB8
Israel			DG245A ABT			United Kingdom			DG245A ABU
Italy			DG245A ABZ			United States			DG245A ABA
Japan			DG245A ABK						
Japan (English)			DG245A ACF						
Korea			DG245A AB1						

Table 1-2
HP Compaq Notebook nc4000 Models *(Continued)*

Cnc4000	P	130	X2	30	N	G/p	25	O	
Belgium			DG989A UUG			The Netherlands			DG989A ABH
Denmark			DG989A ABY			Norway			DG989A ABN
Europe			DG989A ABB			Portugal			DG989A AB9
France			DG989A ABF			Spain			DG989AABE
Germany			DG989A ABD			Sweden/Finland			DG989A AK8
Greece			DG989A AB7			Switzerland			DG989A UUZ
Italy			DG989A ABZ			United Kingdom			DG989A ABU
Cnc4000	P	130	X2	30	N	G/p	25	2	
Belgium			DG990A UUG			The Netherlands			DG990A ABH
Denmark			DG990A ABY			Norway			DG990A ABN
Europe			DG990A ABB			Portugal			DG990A AB9
France			DG990A ABF			Spain			DG990AABE
Germany			DG990A ABD			Sweden/Finland			DG990A AK8
Greece			DG990A AB7			Switzerland			DG990A UUZ
Italy			DG990A ABZ			United Kingdom			DG990A ABU

1.2 Features

- Intel Pentium-M 1.6-, 1.5-, 1.4-, or 1.3-GHz processor with 400-MHz processor side bus and 1024-KB L2 cache, varying by notebook model
- 12.1-inch XGA (1024 × 768) TFT display with over 16.7 million colors, varying by notebook model
- ATI Mobility Radeon graphics with user selectable 32- or 64-MB DDR Synchronous DRAM (SDRAM)
- 60-, 40-, or 30-GB high-capacity hard drive, varying by notebook model
- 256-MB high-performance SDRAM, expandable to 1.0 GB
- Microsoft Windows 2000 or Windows XP Pro, varying by notebook model
- Full-size Windows 98 keyboard with Dual Stick (TouchPad and pointing stick)

- 56-Kbps V.92 modem integrated on the system board
- Integrated Secure Digital (SD) flash media slot
- Integrated wireless support of 802.11a/b/g and Bluetooth devices
- Support for one Type I or II PC Card slot with support for both 32-bit CardBus and 16-bit PC Cards
- External 65 W AC adapter with power cord
- 6-cell Li ion battery pack
- PremierSound 16-bit sound
- Support for the following drives through the optional Advanced or Common Port Replicators or the USB MultiBay cradle:
  - 1.44-MB diskette drive
  - 24X Max CD-ROM drive
  - 8X Max CD-RW drive
  - 8X Max DVD-ROM drive
  - 8X Max DVD-CDRW combination drive
- Connectors for:
  - One Type II PC Card slot
  - External monitor
  - Microphone in
  - DC power
  - RJ-11 (modem)
  - RJ-45 (NIC)
  - Infrared port
  - S-video TV-out connector
  - USB port
  - Docking connector
  - Travel battery connector

1.3 Clearing a Password

If the notebook you are servicing has an unknown password, follow these steps to clear the password. These steps also clear CMOS:

1. Prepare the notebook for disassembly (refer to Section 5.3, "Preparing the Notebook for Disassembly," for more information).
2. Remove the real time clock (RTC) battery (refer to Section 5.16, "RTC Battery").
3. Wait approximately five minutes.
4. Replace the RTC battery and reassemble the notebook.
5. Connect AC power to the notebook. Do **not** reinsert any battery packs at this time.
6. Turn on the notebook.

All passwords and all CMOS settings have been cleared.

1.4 Power Management

The notebook comes with power management features that extend battery operating time and conserve power. The notebook supports the following power management features:

- Standby
- Hibernation
- Setting customization by the user
- Hotkeys for setting level of performance
- Battery calibration
- Lid switch Standby/resume
- Power/Standby button
- Advanced Configuration and Power Management (ACP) compliance

1.5 External Components

The external components on the front and right side of the notebook are shown in below and described in Table 1-3.

Front and Right Side Components

Table 1-3
Front and Right Side Components

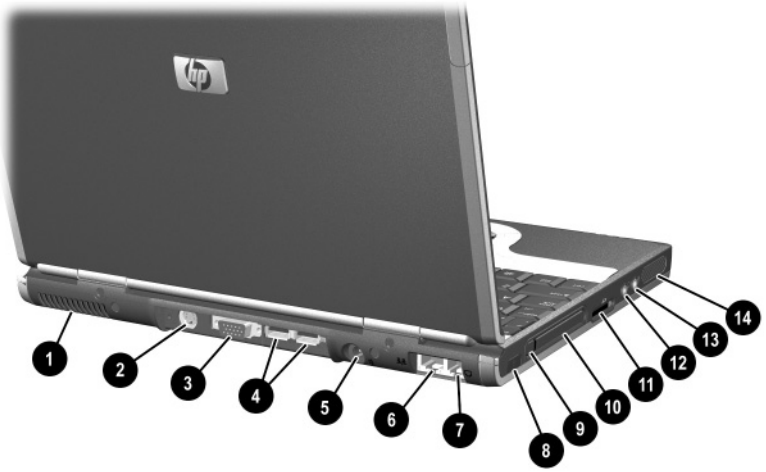
Item	Component	Function
1	Microphone	Inputs single-channel sound.
2	Wireless on/off light	On: The wireless mini PCI card and/or Bluetooth are on. Off: The wireless mini PCI card and Bluetooth are off.
3	Power/Standby light	On: Power is turned on. Blinking: Notebook is in Standby.
4	Battery light	On: A battery pack is charging. Blinking: A battery pack that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light begins blinking more quickly.
5	Display release latch	Opens the notebook.

Table 1-3
Front and Right Side Components *(Continued)*

Item	Component	Function
6	Security cable slot	Attaches an optional security cable to the notebook.
7	Hard drive bay	Holds the primary hard drive.
8	Exhaust vent	Enables airflow to cool internal components.

△ **CAUTION:** To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing can block airflow.

The notebook rear panel and left side components are shown below and described in Table 1-4.



Rear Panel and Left Side Components

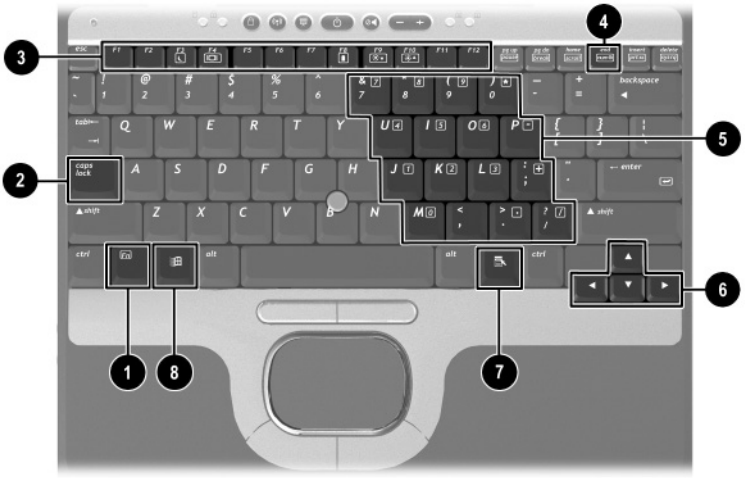
Table 1-4
Rear Panel and Left Side Components

Item	Component	Function
1	Exhaust vent	Enables airflow to cool internal components.
	CAUTION: To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing can block airflow.	
2	S-Video out jack	Connects an optional S-Video device, such as a television, VCR, camcorder, overhead projector, or video capture card.
3	External monitor connector	Connects an optional external monitor or overhead projector.

Table 1-4
Rear Panel and Left Side Components *(Continued)*

Item	Component	Function
4	USB connectors (2)	Connect USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable. The right connector also functions as a self-powered USB connector and allows an optional External MultiBay to be connected to the notebook using the External MultiBay-Powered USB cable.
5	DC power connector RJ-45 jack RJ-11 jack	Connects an AC adapter or an optional Automobile power adapter/charger, aircraft power adapter, or DC cable.
6	RJ-45 network jack	Connects a network cable.
7	RJ-11 modem jack	Connects a modem cable.
8	Infrared port	Links another IrDA-compliant device for wireless communication.
9	PC Card eject button	Ejects an optional PC Card from the PC Card slot.
10	PC Card slot	Supports optional Type I or Type II 32-bit (CardBus) or 16-bit PC Cards.
11	Secure Digital (SD) slot	Supports SD Cards and MMCs (multimedia cards).
12	Audio line-out jack	Connects optional powered stereo speakers, headphones, headset, or television audio.
13	Microphone input jack	Connects an optional monaural microphone.
14	Speaker	Produces system sound.

The notebook keyboard components are shown below and described in Table 1-5.

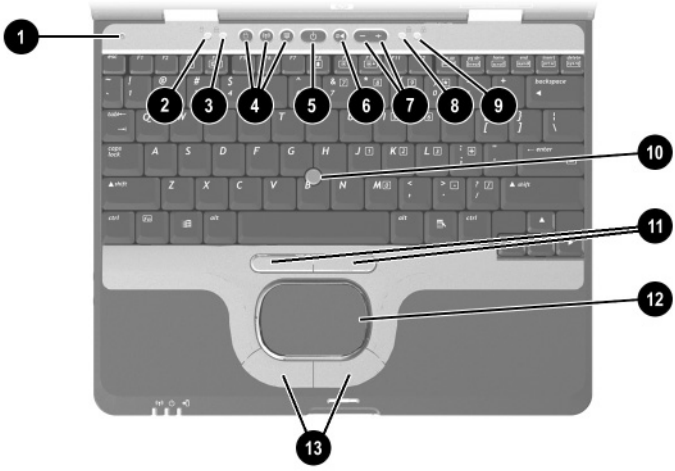


Keyboard Components

Table 1-5
Keyboard Components

Item	Component	Function
1	**Fn** key	Executes frequently used system functions when pressed in combination with another key.
2	**Caps lock** key	On: Caps lock is on.
3	**F1** through **F12** function keys	Execute frequently used system functions when pressed in combination with the Fn key.
4	**Num lock** key	On: Num lock is on and the internal keypad is enabled.
5	Internal keypad	Converts keys to numeric keypad.
6	Cursor control keys	Move the cursor around the screen.
7	Applications key	Displays shortcut menu for items beneath the pointer.
8	Microsoft Windows logo key	Displays the Windows Start menu.

The notebook top components are shown below and described in Table 1-6.



Top Components

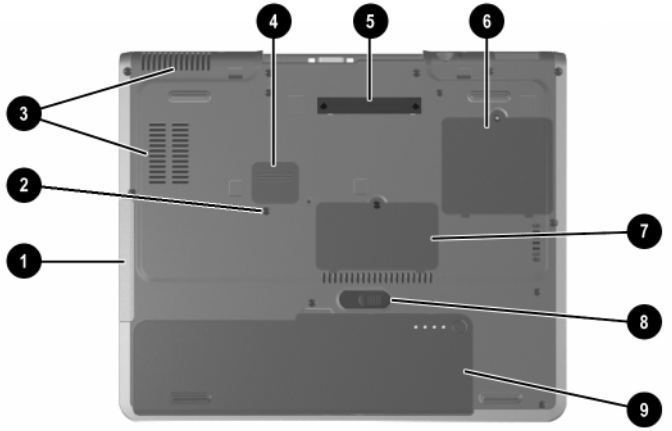
Table 1-6
Top Components

Item	Component	Function
1	Display lid switch	Secures the display when it is closed.
2	Hard drive activity light	On: The hard drive is being accessed.
3	**Num lock** light	On: **Num lock** is on or the embedded numeric keypad is enabled.
4	Quick Launch buttons (3)	Enable you to access common functions with a single keystroke.

Table 1-6
Top Components *(Continued)*

Item	Component	Function
5	Power button	When the notebook is: ■ Off, press and release to turn on the notebook. ■ In Standby, press and release to exit Standby. ■ In Hibernation, press and release to exit Hibernation. If the system has stopped responding and Windows shut down procedures cannot be used, press and hold for 5 seconds to turn off the notebook.
6	Mute button	Mutes system volume.
7	Volume buttons (2)	Adjust the system volume.
8	Caps lock light	On: Caps lock is on.
9	Scroll lock light	On: Scroll lock is on.
10	Pointing stick	Moves the pointer and selects or activates items on the screen.
11	Pointing stick buttons	Function like the left and right buttons on an external mouse.
12	TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling and double-clicking.
13	TouchPad buttons	Function like the left and right buttons on an external mouse.

The external components on the bottom of the notebook are shown below and described in Table 1-7.



Bottom Components

Table 1-7
Bottom Components

Item	Component	Function
1	Hard drive bay	Supports the primary hard drive. The hard drive is secured to the notebook by one screw.
2	Hard drive retention screw	Secures the hard drive to the notebook.

Table 1-7
Bottom Components *(Continued)*

Item	Component	Function
3	Intake vents	Enable airflow to cool internal components.
△	**CAUTION:** To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing can block airflow.	
4	Travel battery connector	Connects the optional travel battery bay. The travel battery connector has a plastic cover that must be opened before connecting the travel battery bay.
5	Docking connector	Connects the notebook to an optional port replicator.
6	Mini PCI compartment	Contains the mini PCI wireless card.
7	Memory expansion compartment	Contains 1 memory expansion slot for optional memory expansion boards.
8	Battery release latch	Releases the primary battery pack from the battery bay.
9	Battery bay	Holds the primary battery pack.

1.6 Design Overview

This section presents a design overview of key parts and features of the notebook. Refer to Chapter 3, "Illustrated Parts Catalog," to identify replacement parts, and Chapter 5, "Removal and Replacement Procedures," for disassembly steps. The system board provides the following device connections:

- Memory expansion board
- Hard drive
- Display
- Keyboard, TouchPad, and pointing stick
- Audio
- Intel Mobile Pentium-M processors
- Fan
- PC Card
- Modem, NIC, and wireless devices

The notebook uses an electrical fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the notebook.

CAUTION: To properly ventilate the notebook, allow at least a 7.6-cm (3-inch) clearance on the left and right sides of the notebook.

2

Troubleshooting

WARNING: Only authorized technicians trained by HP should repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indication of component replacement or printed wiring board modification may void any warranty or exchange allowances.

2.1 Computer Setup and Diagnostics Utilities

The notebook features two system management utilities:

- **Computer Setup**—A system information and customization utility that can be used even when your operating system is not working or will not load. This utility includes settings that are not available in Windows.

- **Diagnostics for Windows**—A system information and diagnostic utility that is used within your Windows operating system. Use this utility whenever possible to:
  - ❏ Display system information.
  - ❏ Test system components.
  - ❏ Troubleshoot a device configuration problem in Windows 2000, Windows XP Professional, or Windows XP Home.

It is not necessary to configure a device connected to a USB connector on the notebook or an optional docking base.

Using Computer Setup

Information and settings in Computer Setup are accessed from the File, Security, or Advanced menus:

1. Turn on or restart the notebook. Press **F10** while the F10 = ROM-Based Setup message is displayed in the lower left corner of the screen.
   - ❏ To change the language, press **F2.**
   - ❏ To view navigation information, press **F1.**
   - ❏ To return to the Computer Setup menu, press **esc.**
2. Select the File, Security, or Advanced menu.
3. To close Computer Setup and restart the notebook:
   - ❏ Select File > Save Changes and Exit and press **enter.**

   or
   - ❏ Select File > Ignore Changes and Exit and press **enter.**
4. When you are prompted to confirm your action, press **F10.**

Selecting from the File Menu

Table 2-1
File Menu

Select	To Do This
System Information	■ View identification information about the notebook, a docking base, and any battery packs in the system. ■ View specification information about the processor, memory and cache size, and system ROM.
Save to Floppy	Save system configuration settings to a diskette.
Restore from Floppy	Restore system configuration settings from a diskette.
Restore Defaults	Replace configuration settings in Computer Setup with factory default settings. Identification information is retained.
Ignore Changes and Exit	Cancel changes entered during the current session, then exit and restart the notebook.
Save Changes and Exit	Save changes entered during the current session, then exit and restart the notebook.

Selecting from the Security Menu

Table 2-2
Security Menu

Select	To Do This
Setup Password	Enter, change, or delete a setup password. The setup password is called an administrator password in Computer Security, a program accessed from the Windows Control Panel.
Power-on Password	Enter, change, or delete a power-on password.
DriveLock Passwords	Enable/disable DriveLock; change a DriveLock User or Master password. ✎ DriveLock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the notebook.
Password Options (Password options can be selected only when a power-on password has been set.)	Enable/disable: ■ QuickLock ■ QuickLock on Standby ■ QuickBlank ✎ To enable QuickLock on Standby or QuickBlank, you must first enable QuickLock.
Device Security	Enable/disable: ■ Ports or diskette drives* ■ Diskette write* ■ CD-ROM or diskette startup ✎ Settings for a DVD-ROM can be entered in the CD-ROM field.
System IDs	Enter identification numbers for the notebook, a docking base, and all battery packs in the system.

*Not applicable to SuperDisk LS-120 drives.

Selecting from the Advanced Menu

Table 2-3
Advanced Menu

Select	To Do This
Language	Change the Computer Setup language.
Boot Options	Enable/disable: ■ QuickBoot, which starts the notebook more quickly by eliminating some startup tests. (If you suspect a memory failure and want to test memory automatically during startup, disable QuickBoot.) ■ MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system.
Device Options	■ Enable/disable the embedded numeric keypad at startup. ■ Enable/disable multiple standard pointing devices at startup. (To set the notebook to support only a single, usually nonstandard, pointing device at startup, select Disable.) ■ Enable/disable USB legacy support for a USB keyboard. (When USB legacy support is enabled, the keyboard works even when a Windows operating system is not loaded.) ■ Set an optional external monitor or overhead projector connected to a video card in a docking base as the primary device. (When the notebook display is set as secondary, the notebook must be shut down before undocking from a docking base.)

Table 2-3
Advanced Menu *(Continued)*

Select	To Do This
Device Options *(continued)*	■ Change the parallel port mode from Enhanced Parallel Port (EPP, the default setting) to standard, bidirectional, EPP, or Enhanced Capabilities Port (ECP). ■ Set video-out mode to NTSC (default), PAL, NTSC-J, or PAL-M.* ■ Enable/disable all settings in the SpeedStep window. (When Disable is selected, the notebook runs in Battery Optimized mode.) ■ Specify how the notebook recognizes multiple identical docking bases that are identically equipped. Select Disable to recognize the docking bases as a single docking base; select Enable to recognize the docking bases individually, by serial number. ■ Enable/disable the reporting of the processor serial number by the processor to the software.
HDD Self Test Options	Run a quick comprehensive self test on hard drives in the system that support the test features.

*Video modes vary even within regions. However, NTSC is common in North America; PAL, in Europe, Africa, and the Middle East; NTSC-J, in Japan; and PAL-M, in Brazil. Other South and Central American regions may use NTSC, PAL, or PAL-M.

2.2 Using Diagnostics for Windows

When you access Diagnostics for Windows, a scan of all system components is displayed on the screen before the diagnostics window opens.

You can display more or less information from anywhere within Diagnostics for Windows by selecting Level on the menu bar.

Diagnostics for Windows is designed to test HP components. If non-HP components are tested, the results might be inconclusive.

Obtaining, Saving, or Printing Configuration Information

1. Access Diagnostics for Windows by selecting Start > Settings > Control Panel > Diagnostics for Windows.
2. Select Categories, then select a category from the drop-down list.
   - ❏ To save the information, select File > Save As.
   - ❏ To print the information, select File > Print.
3. To close Diagnostics for Windows, select File > Exit.

Obtaining, Saving, or Printing Diagnostic Test Information

1. Access Diagnostics for Windows by selecting Start > Settings > Control Panel > Diagnostics for Windows.
2. Select the Test tab.
3. In the scroll box, select the category or device you want to test.
4. Select a test type:
   - ❏ **Quick Test**—Runs a quick, general test on each device in a selected category.
   - ❏ **Complete Test**—Performs maximum testing on each device in a selected category.
   - ❏ **Custom Test**—Performs maximum testing on a selected device.
     - ◆ To run all tests for your selected device, select the Check All button.
     - ◆ To run only the tests you select, select the Uncheck All button, then select the checkbox for each test you want to run.
5. Select a test mode:
   - ❏ **Interactive Mode**—Provides maximum control over the testing process. You determine whether the test was passed or failed and might be prompted to insert or remove devices.
   - ❏ **Unattended Mode**—Does not display prompts. If errors are found, they are displayed when testing is complete.

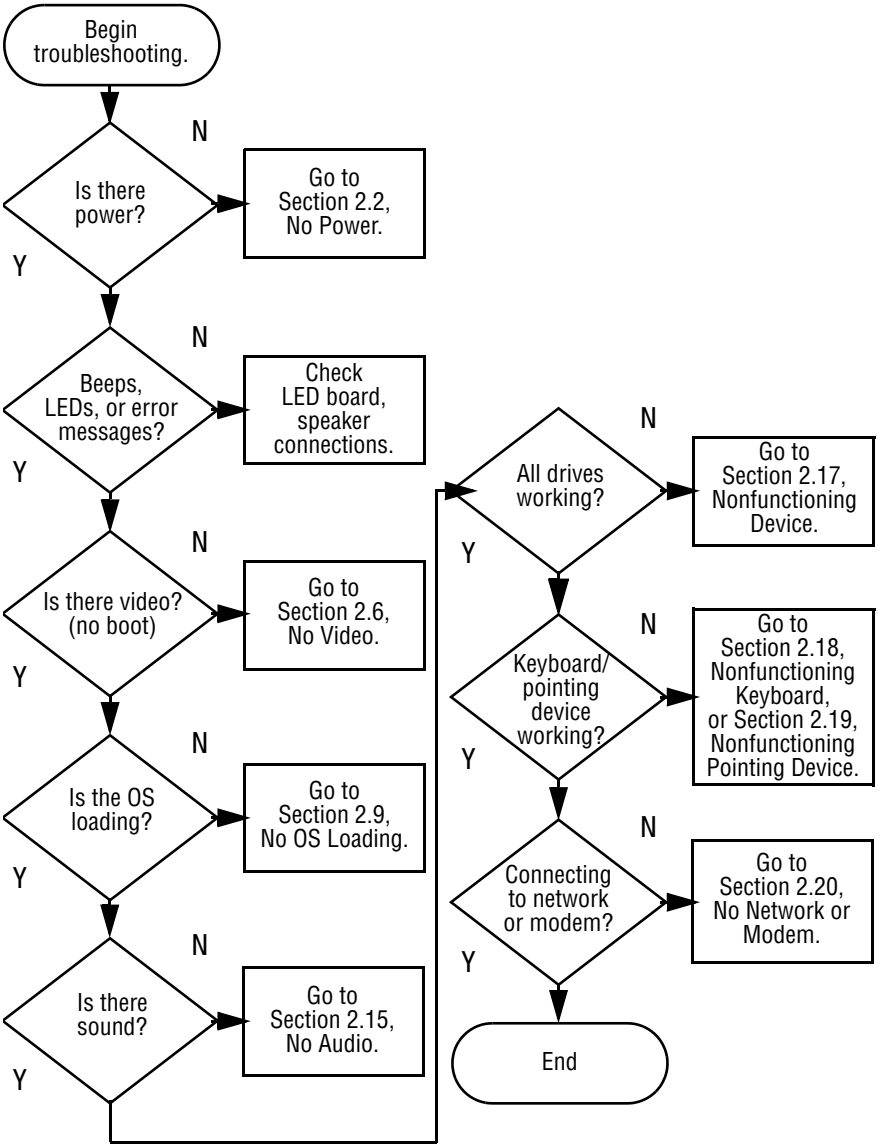
6. Select the Begin Testing button.
7. Select a tab to view a test report:
   - ❏ **Status tab**—Summarizes the tests run, passed, and failed during the current testing session.
   - ❏ **Log tab**—Lists tests run on the system, the number of times each test has run, the number of errors found on each test, and the total run time of each test.
   - ❏ **Error tab**—Lists all errors found in the notebook with the corresponding error codes.
8. Select a tab to save the report:
   - ❏ **Log tab**—Select the Log tab Save button.
   - ❏ **Error tab**—Select the Error tab Save button.
9. Select a tab to print the report:
   - ❏ **Log tab**—Select File > Save As, then print the file from your folder.

2.3 Troubleshooting Flowcharts

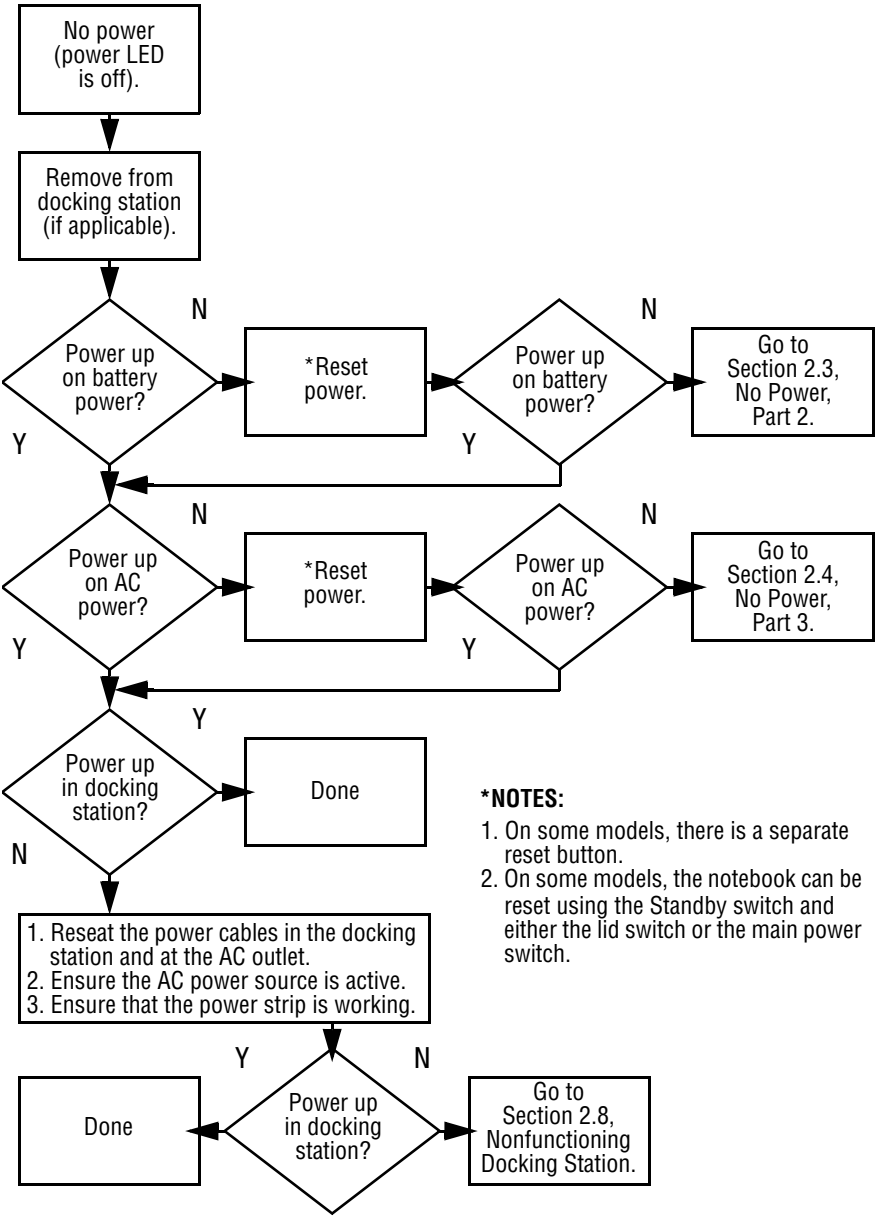
Table 2-4
Troubleshooting Flowcharts Overview

Flowchart	Description
2.1	Initial troubleshooting
2.2	No power, part 1
2.3	No power, part 2
2.4	No power, part 3
2.5	No power, part 4
2.6	No video, part 1
2.7	No video, part 2
2.8	Nonfunctioning docking station
2.9	No operating system (OS) loading
2.10	No OS loading from hard drive, part 1
2.11	No OS loading from hard drive, part 2
2.12	No OS loading from hard drive, part 3
2.13	No OS loading from diskette drive
2.14	No OS loading from CD- or DVD-ROM drive
2.15	No audio, part 1
2.16	No audio, part 2
2.17	Nonfunctioning device
2.18	Nonfunctioning keyboard
2.19	Nonfunctioning pointing device
2.20	No network or modem connection

Flowchart 2.1—Initial Troubleshooting



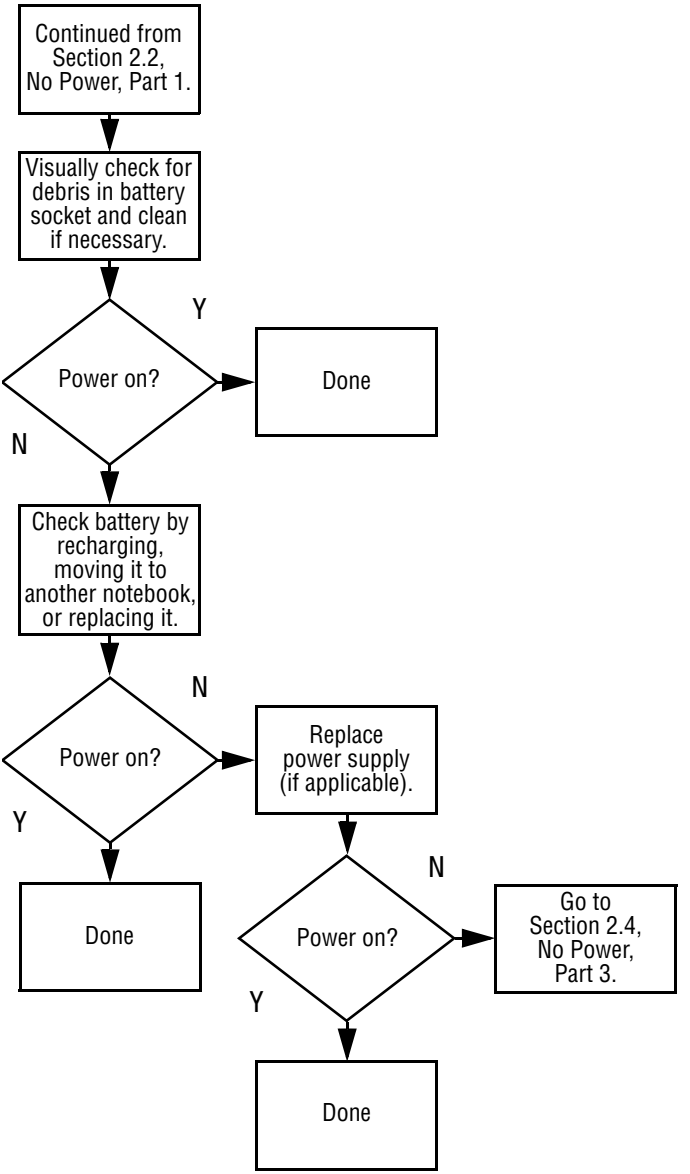
Flowchart 2.2—No Power, Part 1



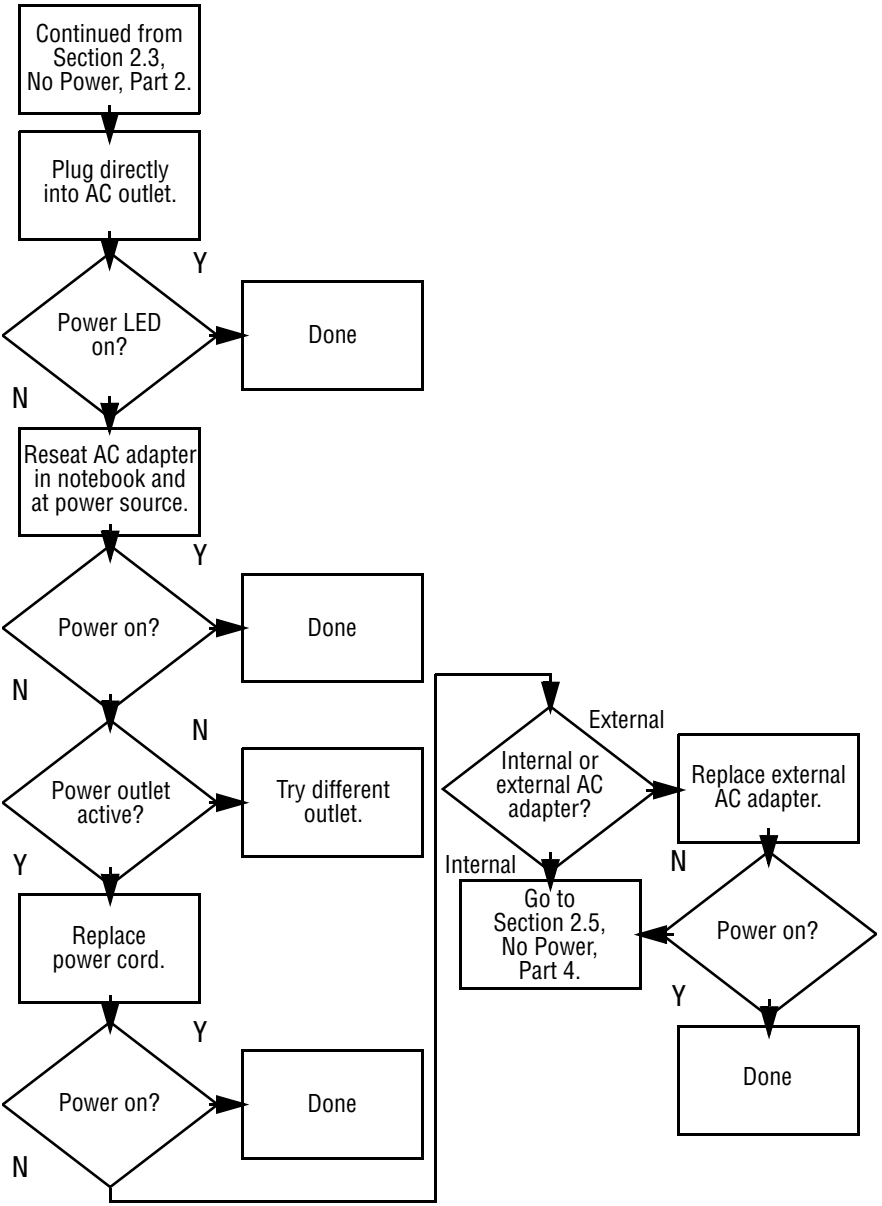
***NOTES:**

1. On some models, there is a separate reset button.
2. On some models, the notebook can be reset using the Standby switch and either the lid switch or the main power switch.

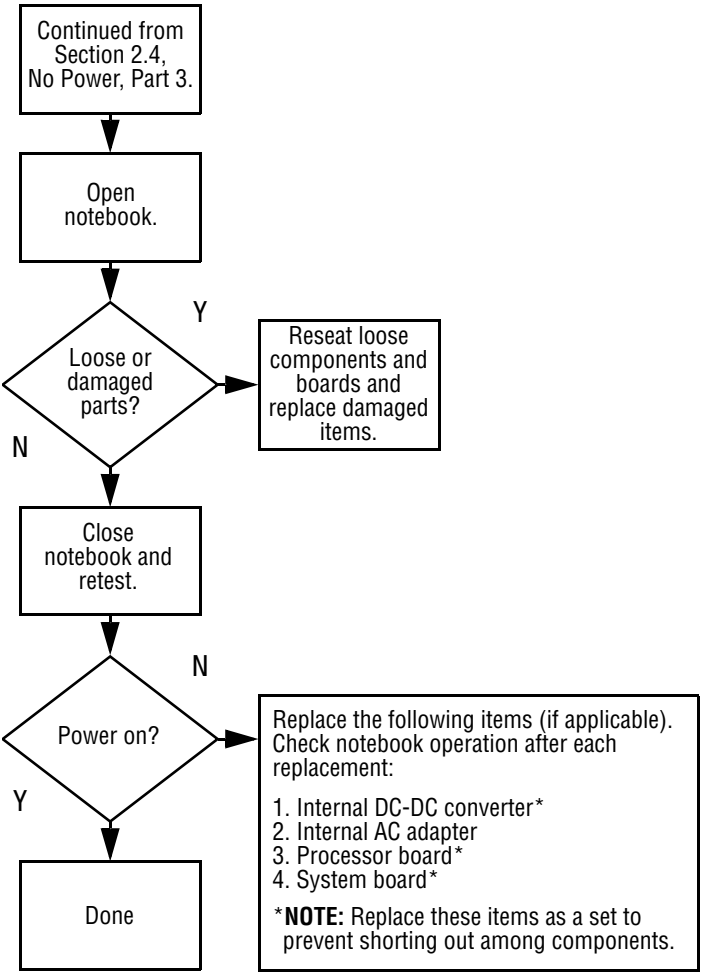
Flowchart 2.3—No Power, Part 2



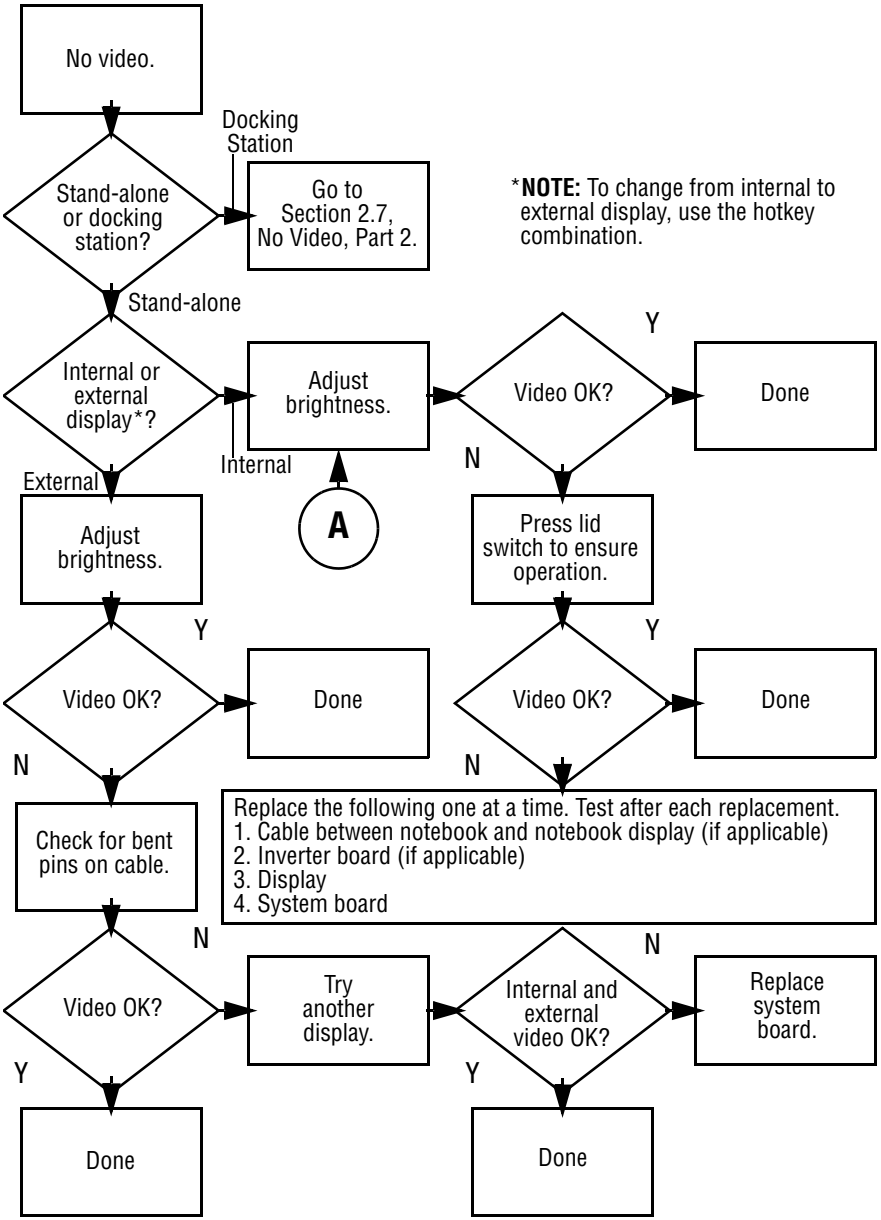
Flowchart 2.4—No Power, Part 3



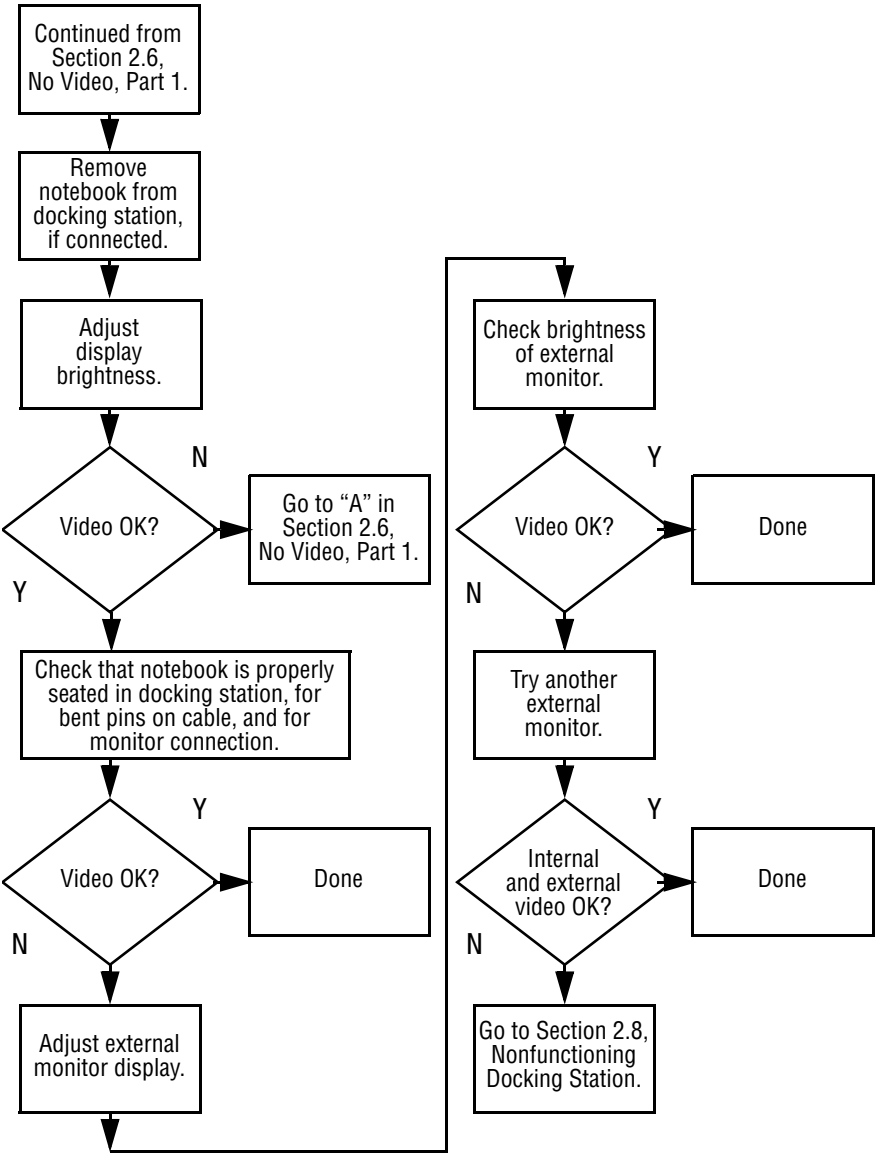
Flowchart 2.5—No Power, Part 4



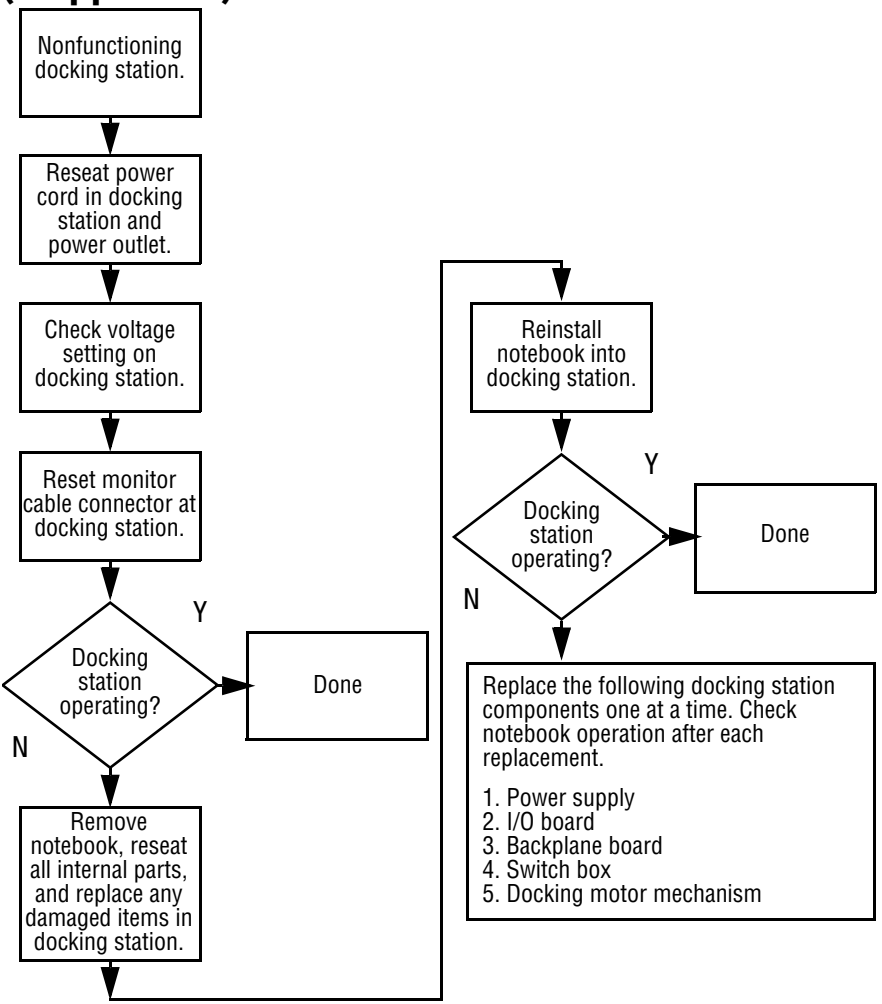
Flowchart 2.6—No Video, Part 1



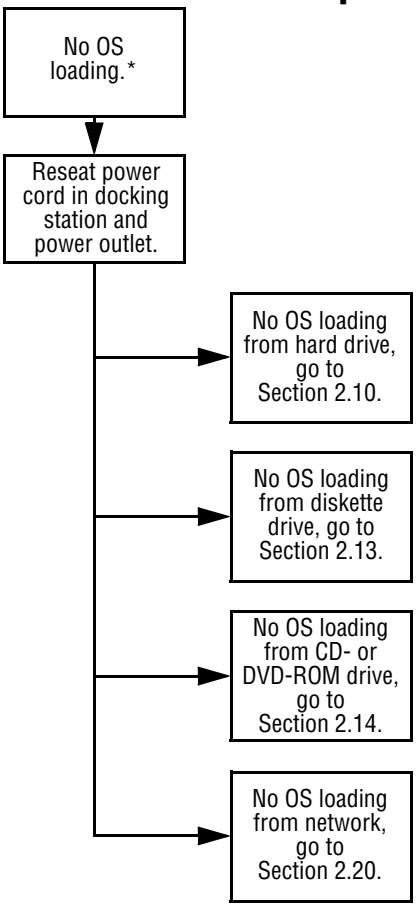
Flowchart 2.7—No Video, Part 2



Flowchart 2.8—Nonfunctioning Docking Station (if applicable)

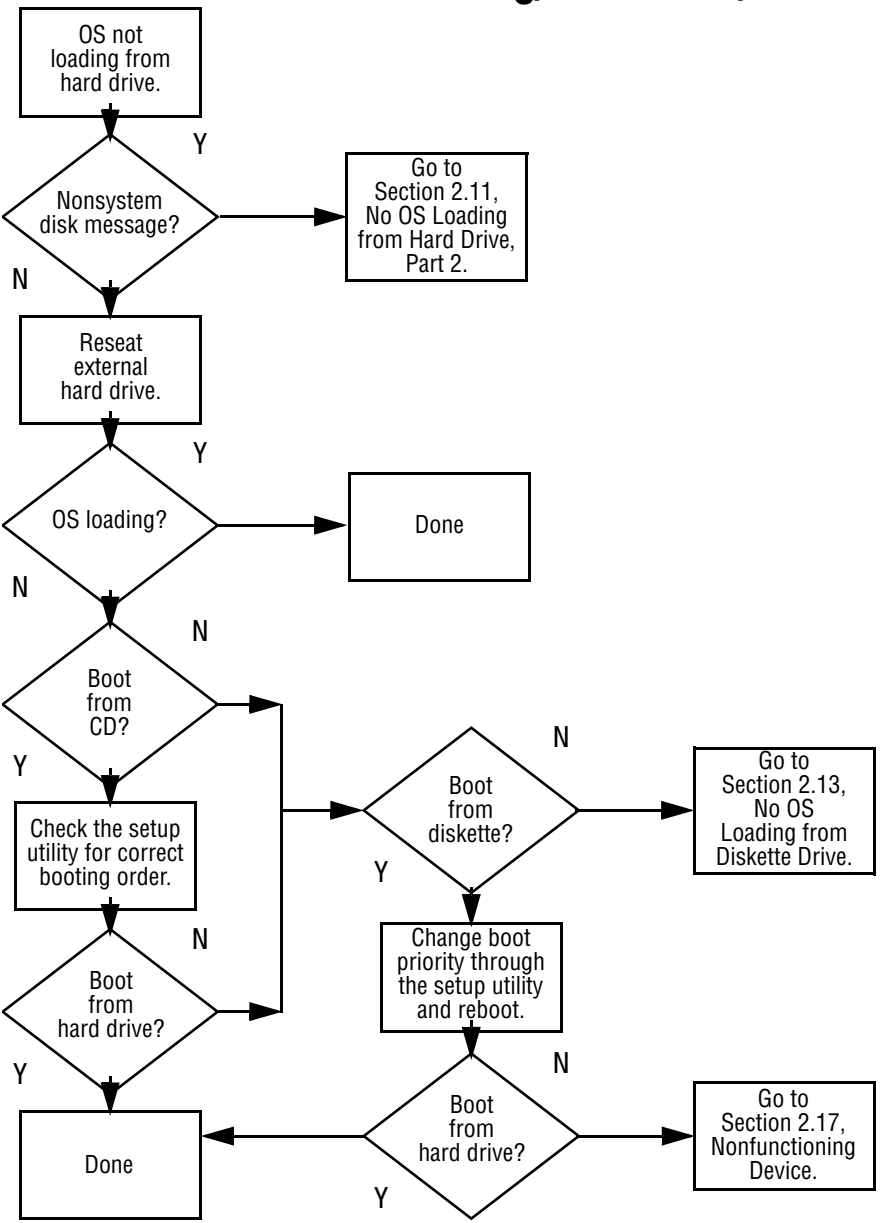


Flowchart 2.9—No Operating System (OS) Loading

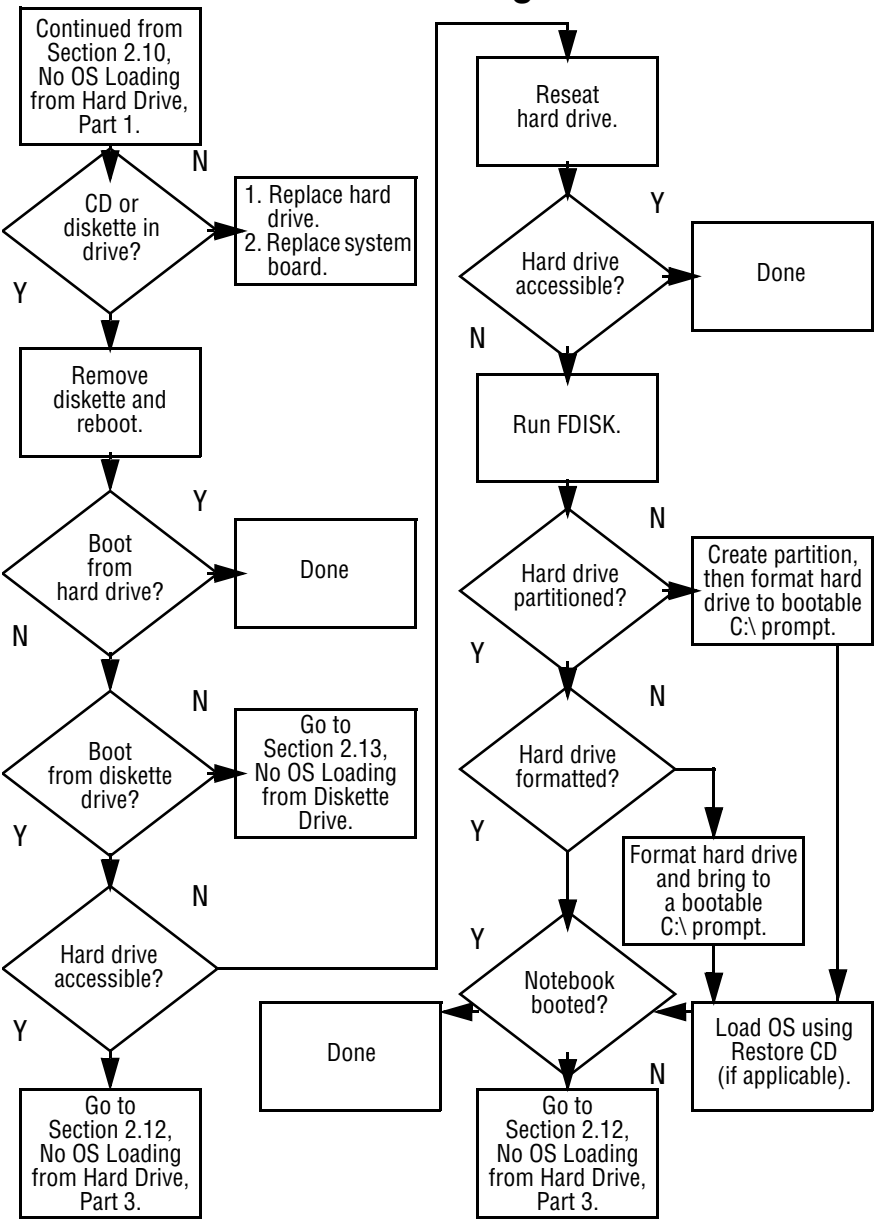


*__NOTE:__ Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

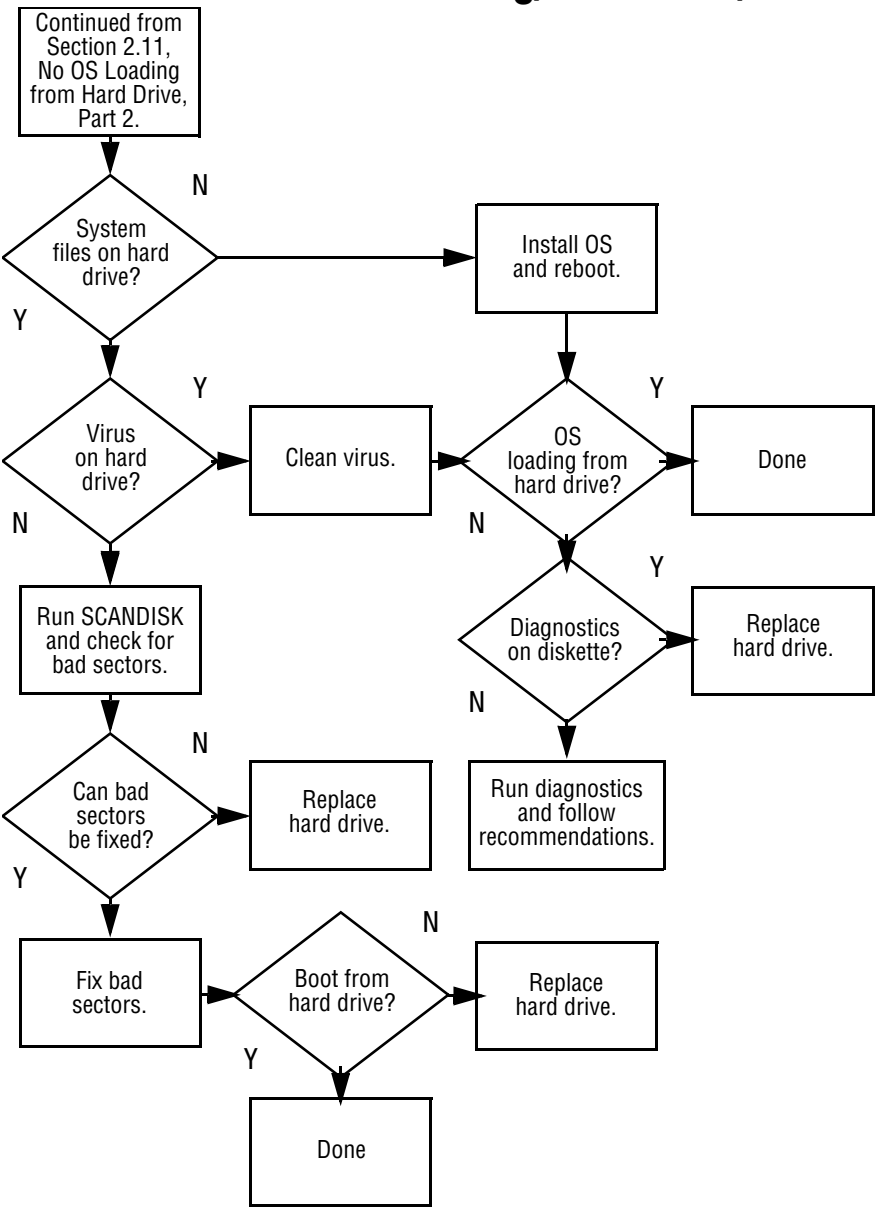
Flowchart 2.10—No OS Loading, Hard Drive, Part 1



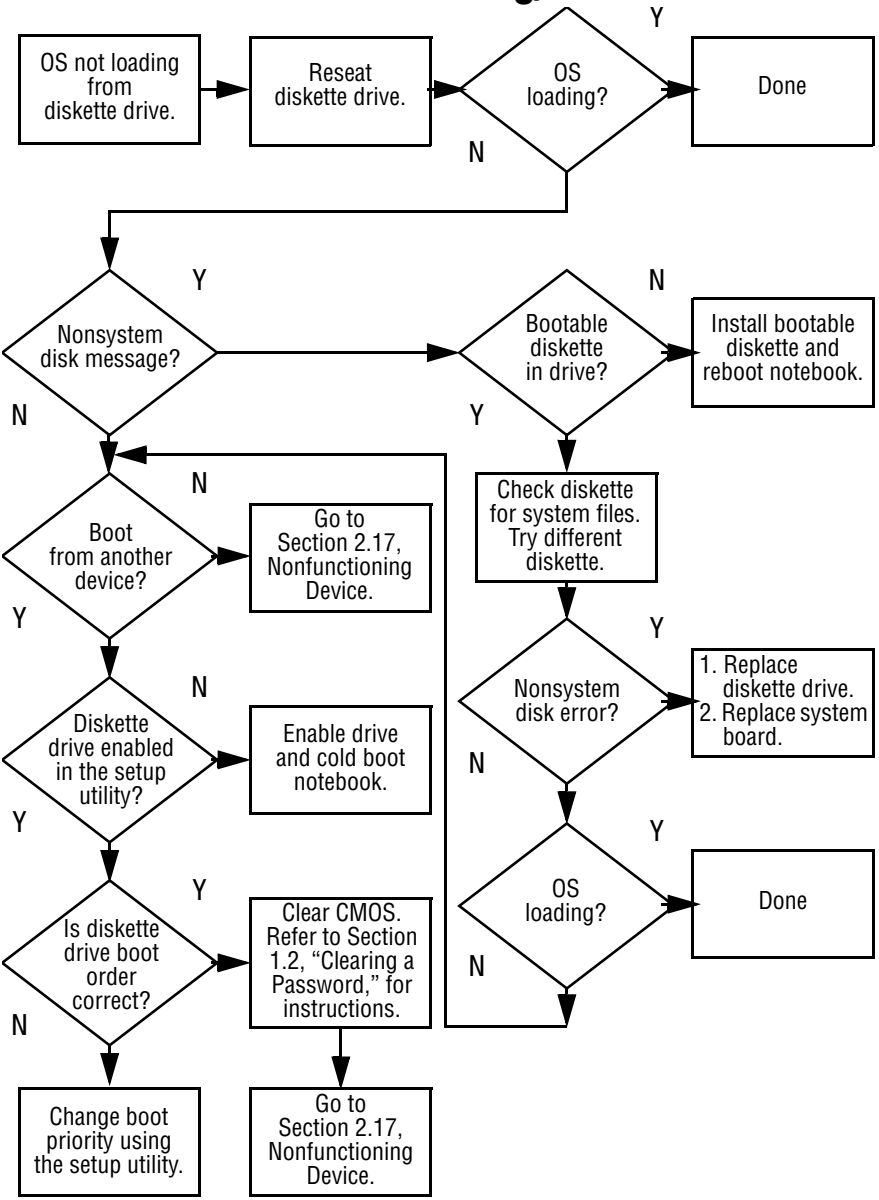
Flowchart 2.11—No OS Loading, Hard Drive, Part 2



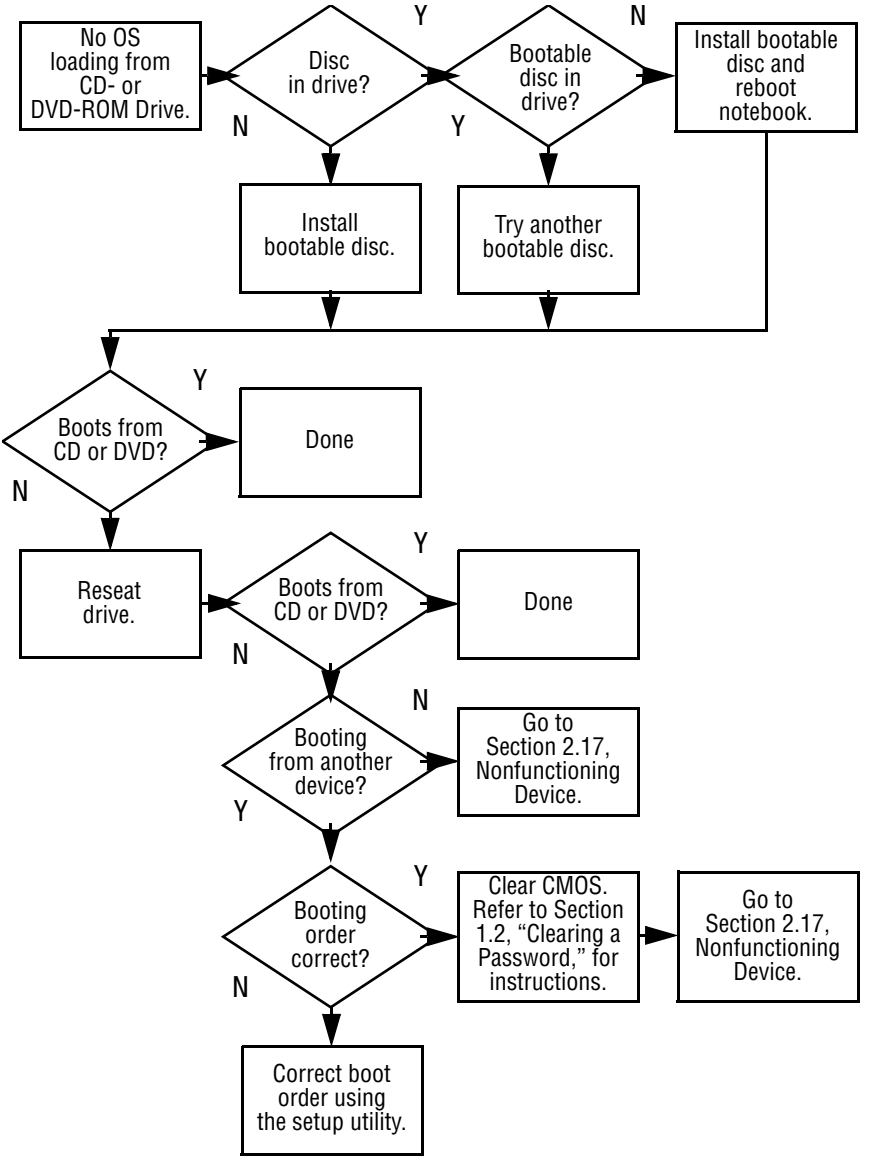
Flowchart 2.12—No OS Loading, Hard Drive, Part 3



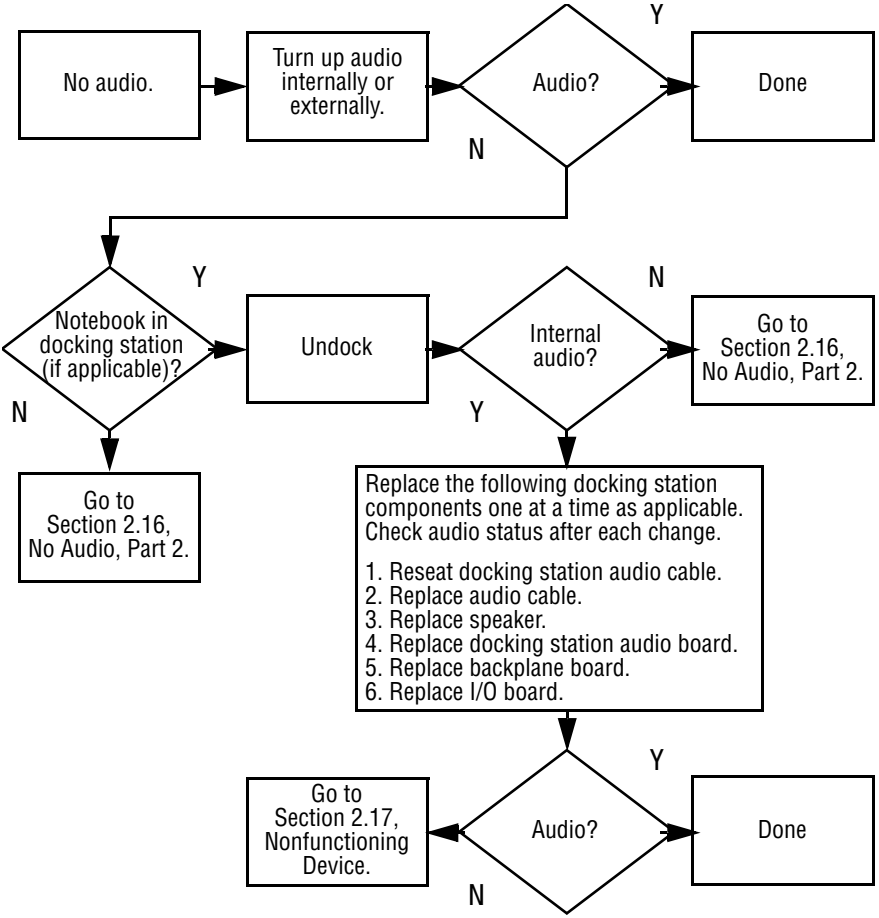
Flowchart 2.13—No OS Loading, Diskette Drive



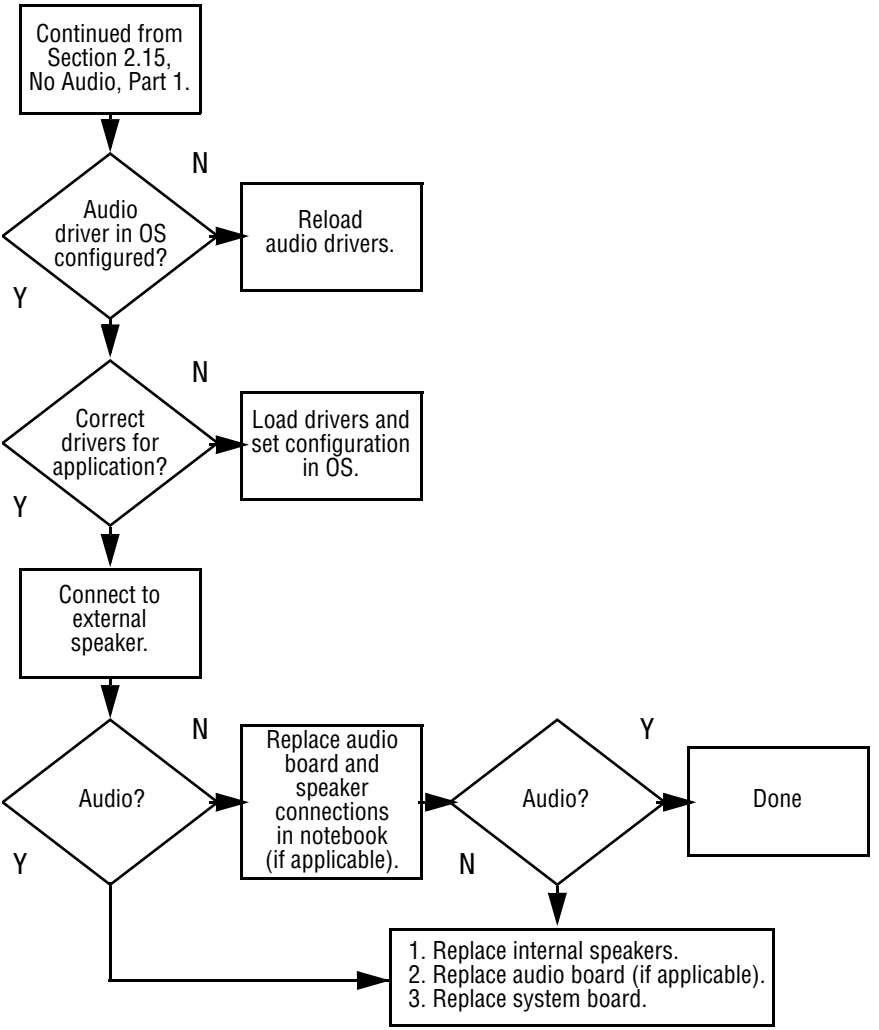
Flowchart 2.14—No OS Loading, CD- or DVD-ROM Drive



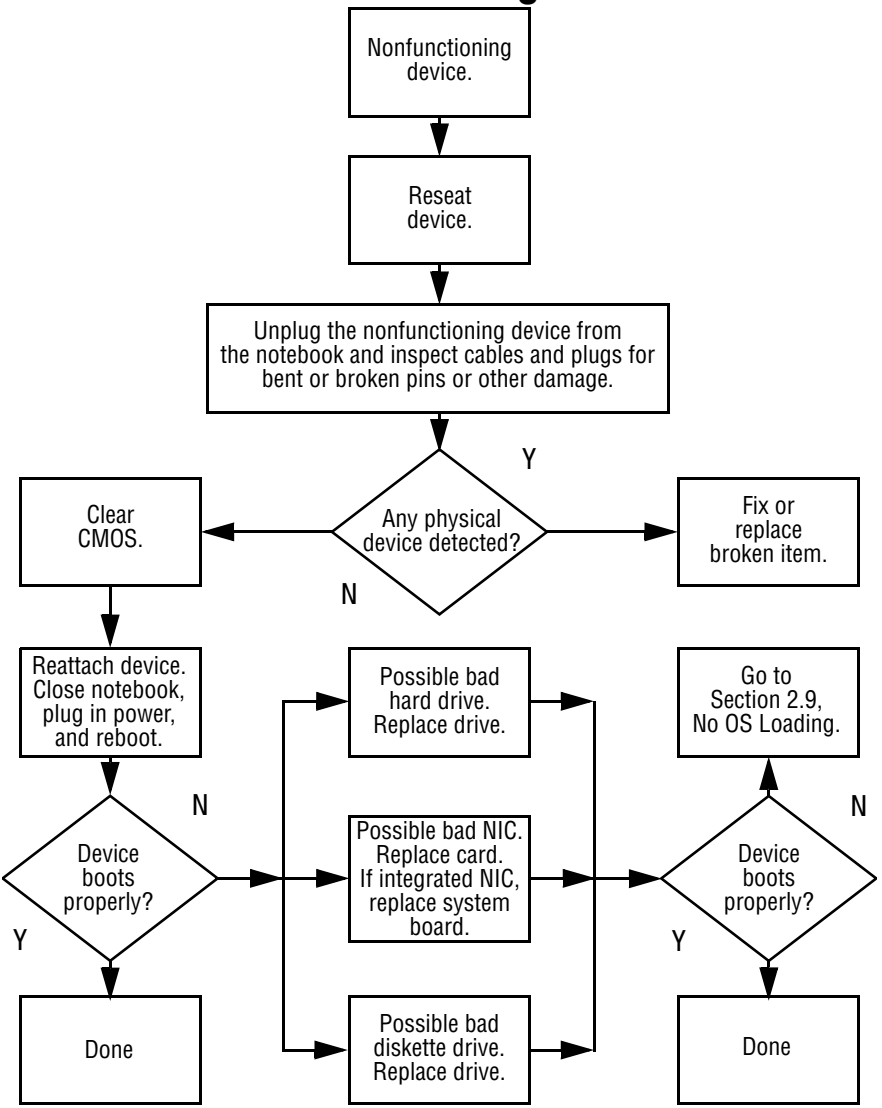
Flowchart 2.15—No Audio, Part 1



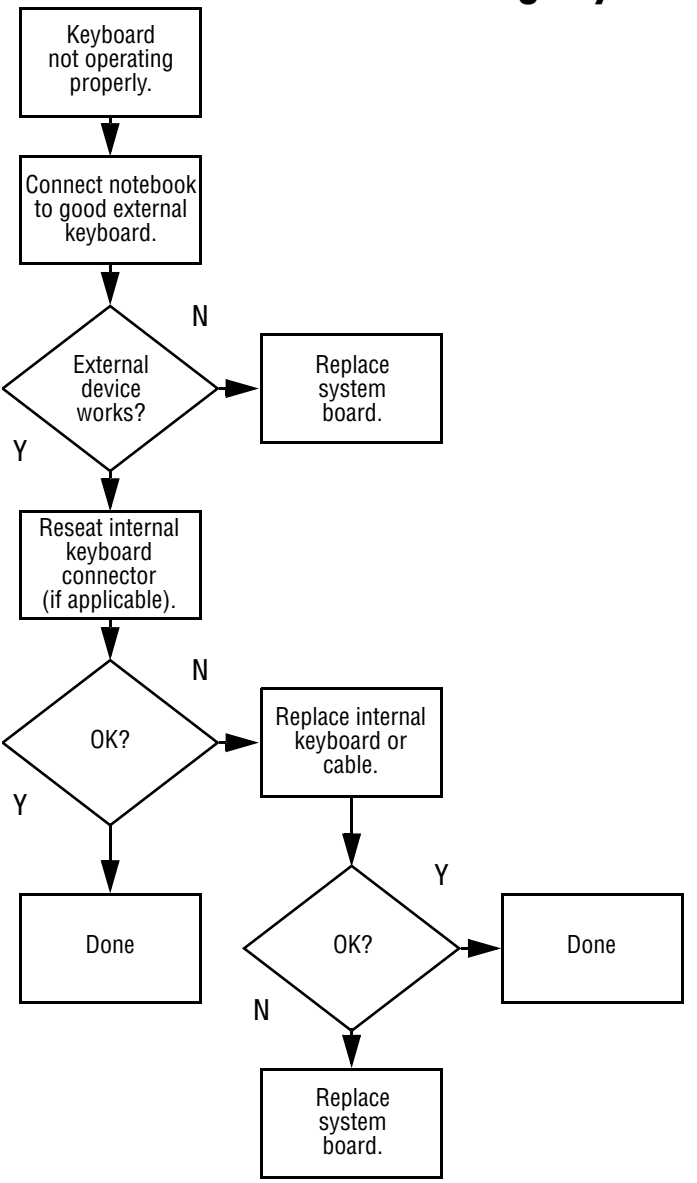
Flowchart 2.16—No Audio, Part 2



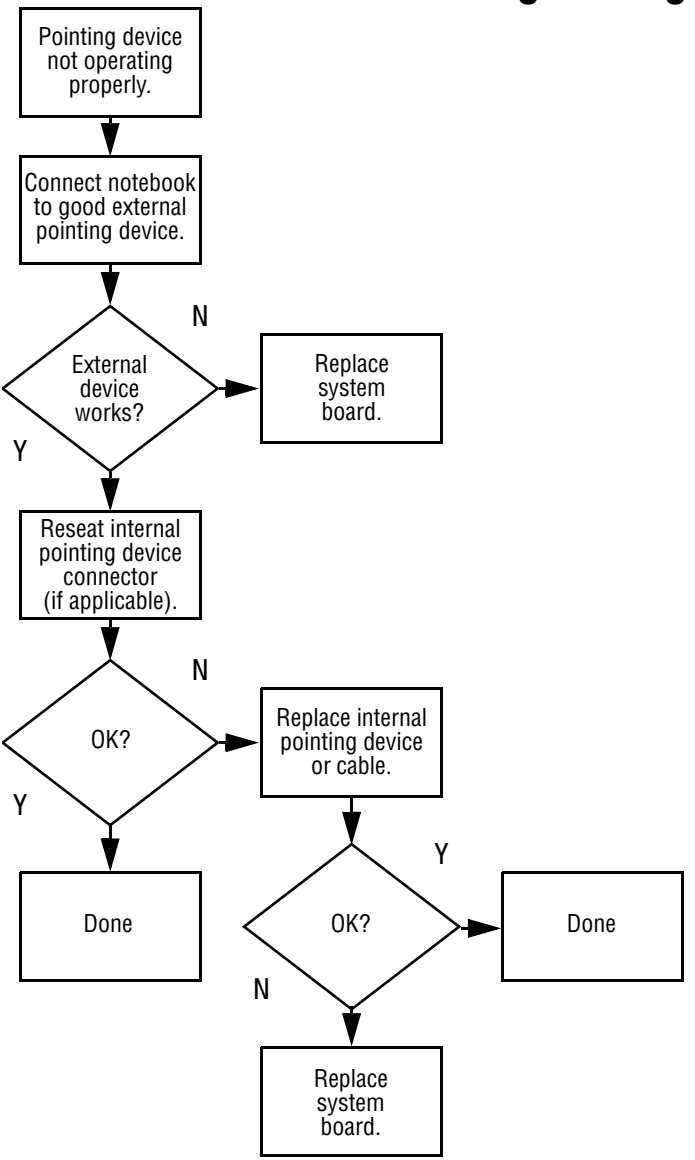
Flowchart 2.17—Nonfunctioning Device



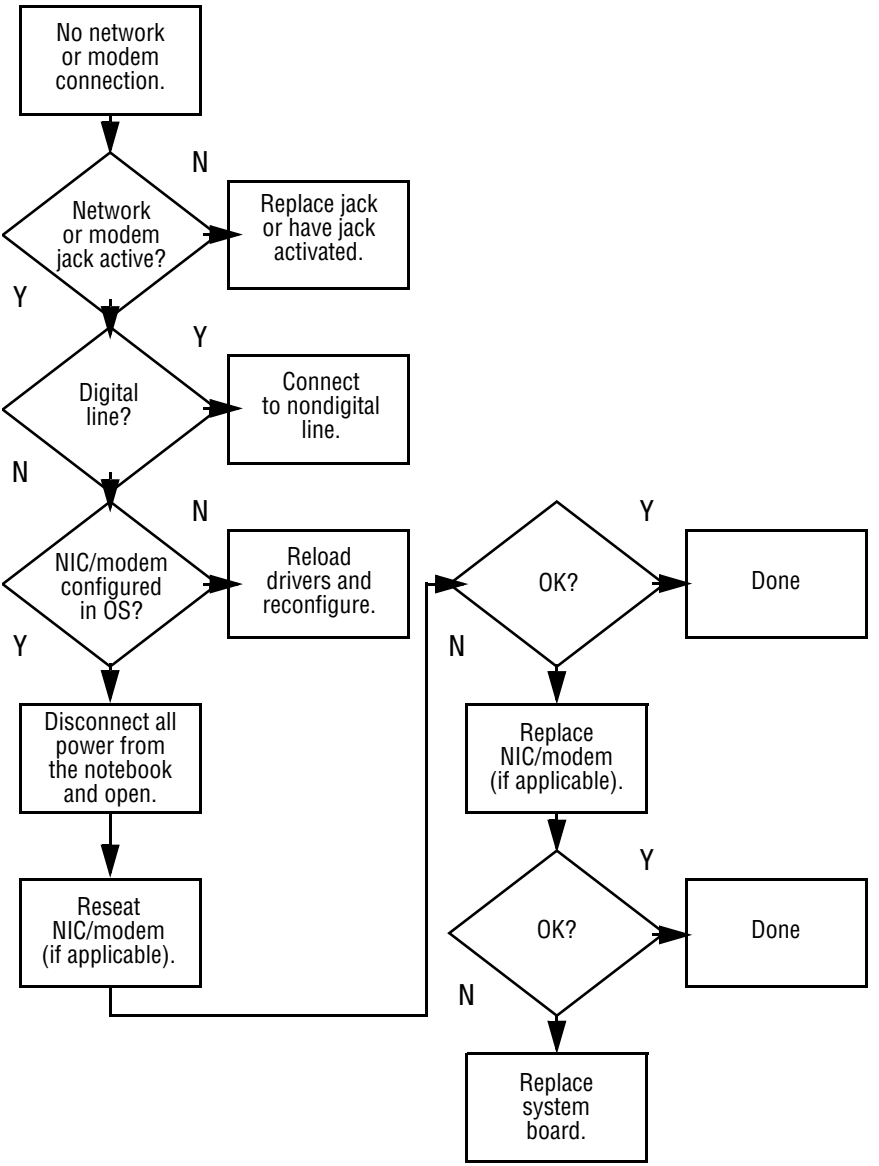
Flowchart 2.18—Nonfunctioning Keyboard



Flowchart 2.19—Nonfunctioning Pointing Device



Flowchart 2.20—No Network/Modem Connection



3

Illustrated Parts Catalog

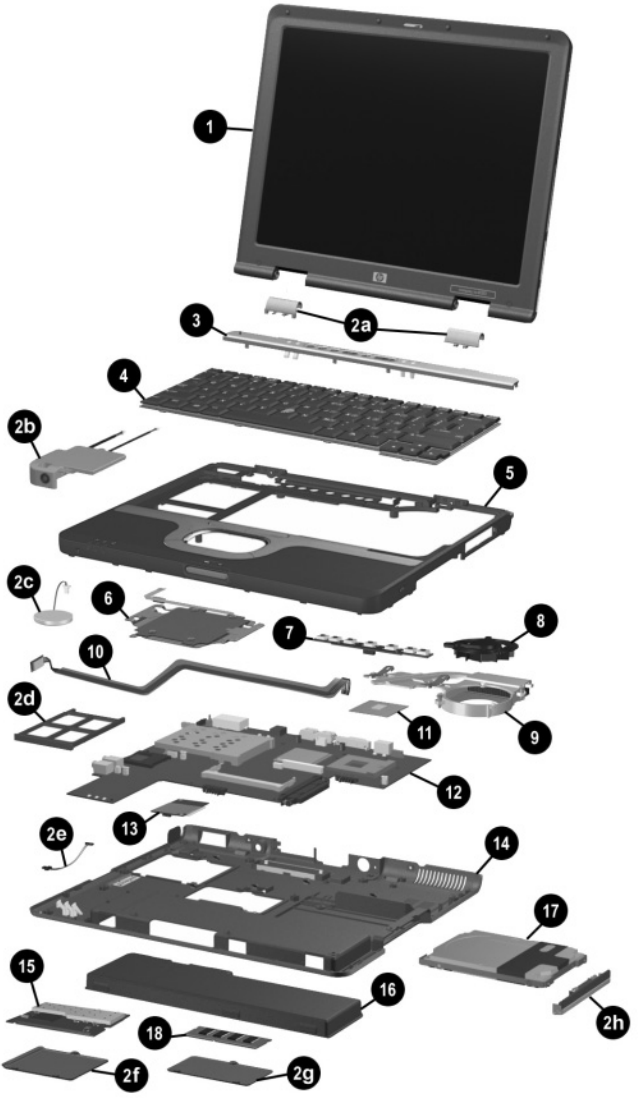
This chapter provides an illustrated parts breakdown and a reference for spare part numbers and option part numbers.

3.1 Serial Number Location

When ordering parts or requesting information, provide the notebook serial number and model number located on the bottom of the notebook.

Serial Number Location

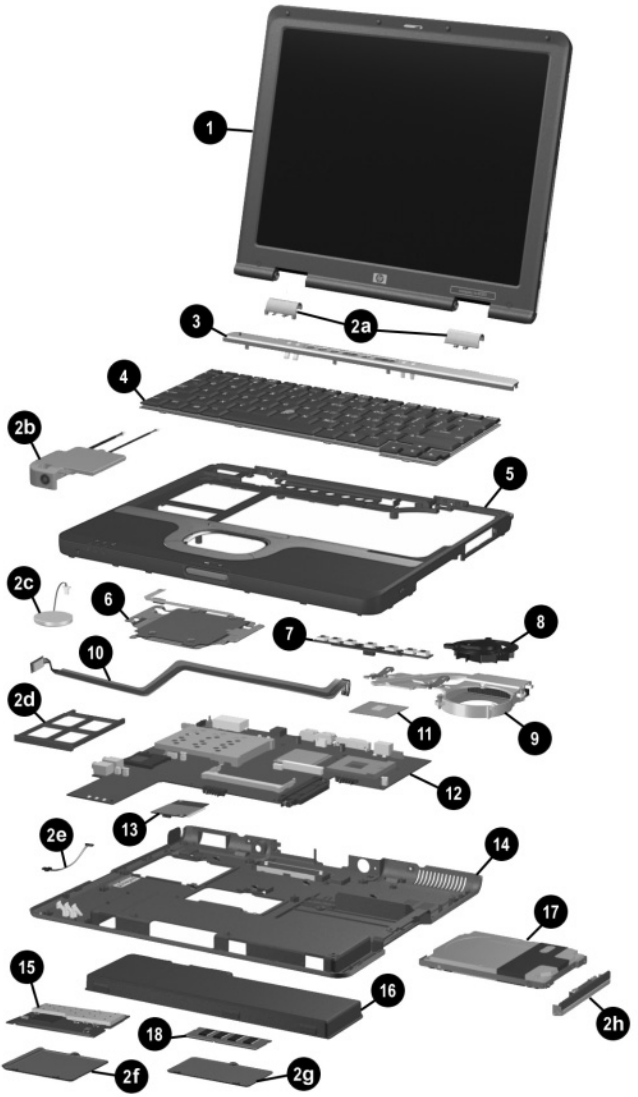
3.2 Notebook Major Components



Notebook Major Components

Table 3-1
Spare Parts: Notebook Major Components

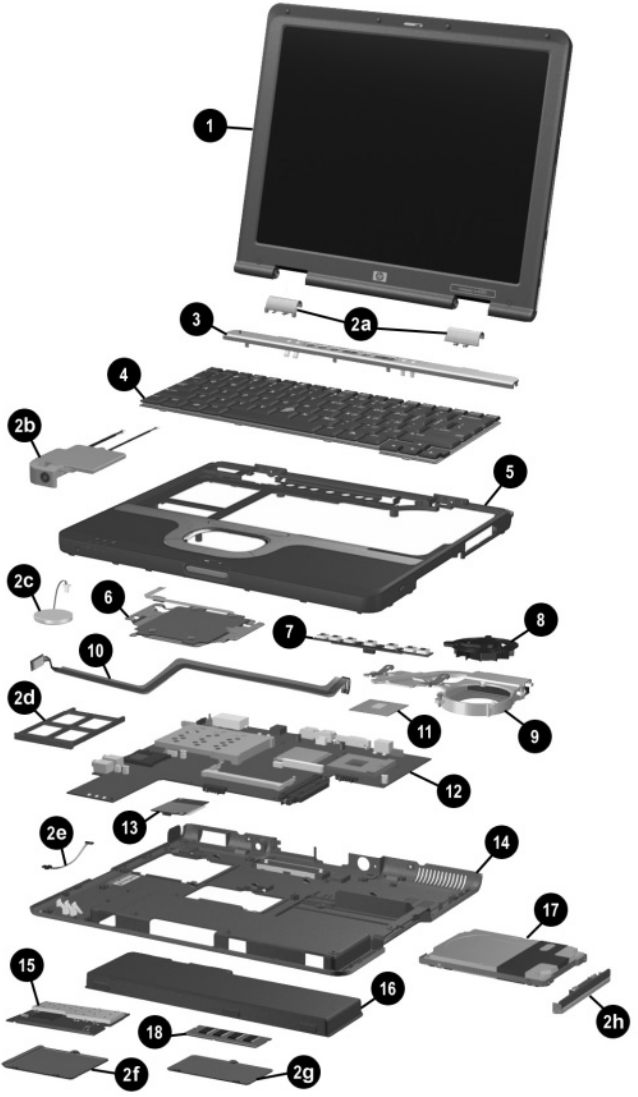
Item	Description	Spare Part Number
1	**Display assembly, 12.1-inch TFT XGA with wireless device antennae**	325509-001
	Miscellaneous Plastics Kit, includes:	325528-001
2a	Left and right display hinge covers	
2b	Speaker/microphone	
2c	RTC battery	
2d	PC Card slot space saver	
2e	Modem cable	
2f	Mini PCI compartment covers (one with a 2.0×4.0 security screw for use with the 5-GHz mini PCI wireless LAN board, one with a Phillips M2.0×4.0 screw for use with other mini PCI wireless LAN boards)	
2g	Memory expansion compartment cover	
2h	Hard drive bezel	
	Not illustrated: Notebook feet (4) Display rubber screw covers (6: 4 round, 2 oblong)	
3	**LED switch cover**	325512-001



Notebook System Major Components

Table 3-1 *(Continued)*
Spare Parts: Notebook Major Components

Item	Description			Spare Part Number
4	**Keyboards,** include pointing stick			
	Asia Pacific	325530-371	Korea	325530-AD1
	Australia	325530-011	Latin America	325530-161
	Brazil	325530-201	The Netherlands	325530-331
	Czech Republic	325530-221	Norway	325530-091
			People's Republic of China	325530-AA1
	Denmark	325530-081		
	Europe	325530-021	Poland	325530-241
	France	325530-051	Portugal	325530-131
	French Canada	325530-121	Russia	325530-251
			Saudi Arabia	325530-171
	Germany	325530-041	Slovakia	325530-231
	Greece	325530-151	Spain	325530-071
	Hong Kong	325530-AC1	Sweden	325530-101
	Hungary	325530-211	Switzerland	325530-111
	Iceland	325530-DD1	Taiwan	325530-AB1
	India	325530-D61	Thailand	325530-281
	International	325530-002	Turkey	325530-141
	Israel	325530-BB1	United Kingdom	325530-031
	Italy	325530-061	United States	325530-001
	Japan	325530-291		
5	**Top cover** (includes TouchPad, speaker/microphone, and RTC battery)			325510-001
6	**TouchPad with cable**			325513-001
7	**Switch board**			325515-001
8	**Fan**			291266-001
9	**Heat sink with fan**			325520-001
10	**Bluetooth wireless device** (not available on all models)			333605-001

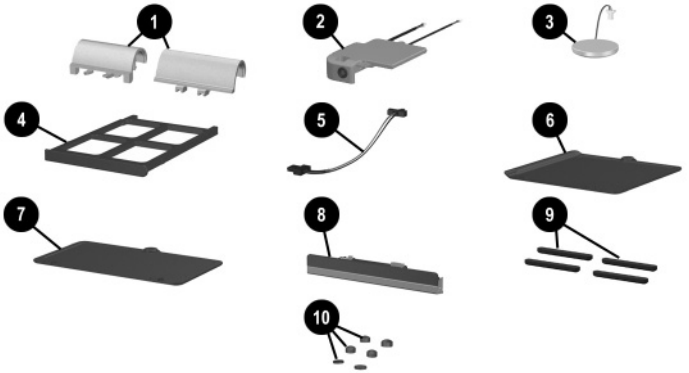


Notebook System Major Components

Table 3-1 *(Continued)*
Spare Parts: Notebook Major Components

Item	Description	Spare Part Number
11	**Processors**	
	Intel Pentium-M 1.6 GHz	319777-001
	Intel Pentium-M 1.5 GHz	319776-001
	Intel Pentium-M 1.4 GHz	319775-001
	Intel Pentium-M 1.3 GHz	319774-001
12	**System board**	325514-001
13	**Modem board with cable**	325521-001
14	**Base enclosure** (includes left and right display supports)	325511-001
15	**Mini PCI communications boards**	
	802.11a/b/g wireless LAN board	333782-001
	802.11b/g wireless LAN board	333781-001
16	**Battery pack, 6 cell, 40 wH**	315338-001
17	**Hard drives** (include hard drive bezel and frame)	
	60 GB	325524-001
	40 GB	325523-001
	30 GB	325522-001
18	**Memory expansion boards**	
	512 MB DDR	280875-001
	256 MB DDR	280874-001

3.3 Miscellaneous Plastics Kit Components

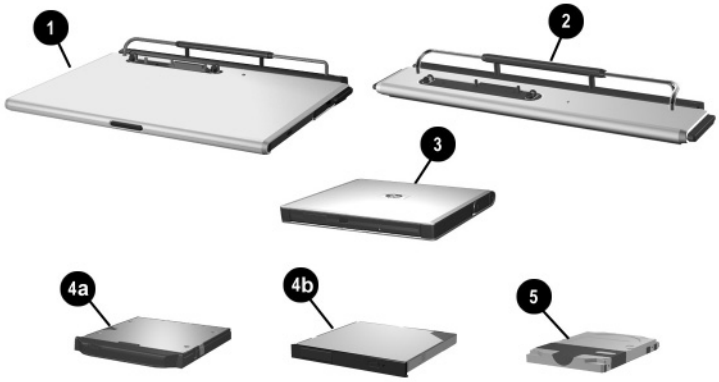


Miscellaneous Plastics Kit Components

Table 3-2
Miscellaneous Plastics Kit Components
Spare Part Number 325528-001

Item	Description
1	Left and right display hinge covers
2	Speaker/microphone
3	RTC battery
4	PC Card slot space saver
5	Modem cable
6	Mini PCI compartment covers (one with a 2.0×4.0 security screw for use with the 5-GHz mini PCI wireless LAN board, one with a Phillips M2.0×4.0 screw for use with other mini PCI wireless LAN boards)
7	Memory expansion compartment cover
8	Hard drive bezel
9	Notebook feet (4)
10	Display rubber screw covers (6: 4 round, 2 oblong)

3.4 Port Replicators and Mass Storage Devices



Port Replicators and Mass Storage Devices

Table 3-3
Port Replicators and Mass Storage Devices

Item	Description	Spare Part Number
1	**Advanced port replicator**	316194-001
2	**Common port replicator**	316193-001
3	**USB MultiBay cradle**	322814-001
	Optical drives (for use only with the Advanced and Common port replicators and USB MultiBay cradle)	
4a	8X Max DVD-ROM drive	202837-001
	24X Max CD-RW drive	323226-001
	24X Max CD-ROM drive	228746-001
	24X Max Slim CD-ROM/CD-RW combination drive	306800-001
4b	1.44-MB diskette drive	241995-001
5	**Hard drives** (include hard drive bezel)	
	60 GB	325524-001
	40 GB	325523-001
	30 GB	325522-001

3.5 Miscellaneous

Table 3-4
Spare Parts: Miscellaneous (not illustrated)

Description	Spare Part Number
65-watt AC adapter	239704-001
Adapter cables	
Air adapter cable	293204-001
Auto adapter cable	293203-001
Carrying cases	
Top load leather cases	325817-001 and 325817-002
Top load nylon cases	325815-001 and 325815-002
Nylon case	325814-001

Table 3-4
Spare Parts: Miscellaneous (not illustrated) *(Continued)*

Description	Spare Part Number
Power cord, three-wire	
Australia 246959-011 Denmark 246959-081 Europe/Middle East/Africa 246959-021 Italy 246959-061 Japan 246959-291 Korea 246959-AD1 Switzerland 246959-AG1 United Kingdom 246959-031 United States 246959-001	
Screw Kit (includes the following screws; refer to Appendix C, "Screw Listing," for more information on screw specifications and usage.) ■ Phillips M2.5×3.5 screw ■ Phillips M2.5×3.0 screw ■ Phillips M2.0×5.0 screw ■ Phillips M2.0×4.0 screw ■ Phillips M2.0×3.0 screw (silver) ■ Phillips M2.0×3.0 screw (black) ■ Spring-loaded Torx T8 M2.0×10.0 screw ■ Torx T8 M2.0×8.0 screw ■ Torx T8 M2.0×6.0 screw ■ Torx T8 M2.0×4.0 screw ■ Torx T5 M2.5×4.5 screw ■ 4.0-mm socket M2.0×10.0 alignment pin ■ M2.0×4.0 security screw	325529-001
Travel battery carrier	325527-001

4

Removal and Replacement Preliminaries

This chapter provides essential information for proper and safe removal and replacement service.

4.1 Tools Required

You will need the following tools to complete the removal and replacement procedures:

- Magnetic screwdriver
- Torx T8 screwdriver
- Torx T5 screwdriver
- Phillips P0 screwdriver
- Flat-bladed tool
- 5.0-mm socket
- 4.0-mm socket
- Tool kit (includes connector removal tool, loopback plugs, and case utility tool)

4.2 Service Considerations

The following sections include some of the considerations that you should keep in mind during disassembly and assembly procedures.

As you remove each subassembly from the notebook, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic Parts

Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and Connectors

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Ensure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

CAUTION: When servicing the notebook, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the notebook.

4.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the notebook, damage to a removable drive, or loss of information, observe the following precautions:

- Before removing or inserting a hard drive, shut down the notebook. If you are unsure whether the notebook is off or in Hibernation, turn the notebook on, then shut it down.
- Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive. Ensure that the optical drive tray is closed.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Handle drives on surfaces that have at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, CD-ROM drive, or a diskette drive, place it in a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or liquids.
- If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “Fragile: Handle With Care.”

4.4 Preventing Electrostatic Damage

Many electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases the discharge contains enough power to alter device parameters or melt silicon junctions.

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs.

An electronic device exposed to electrostatic discharge might not be affected at all and can work perfectly throughout a normal cycle. Or the device might function normally for a while, then degrade in the internal layers, reducing its life expectancy.

4.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.
- Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a sensitive component or assembly.

- Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

4.6 Workstation Precautions

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-shielding material (refer to Table 4-2).
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When using fixtures that must directly contact dissipative surfaces, only use fixtures made of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

4.7 Grounding Equipment and Methods

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, connect a wrist strap with alligator clips.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one-megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Other grounding equipment recommended for use in preventing electrostatic damage includes:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one-megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes

- Metal tote boxes
- Electrostatic voltage levels and protective materials

Table 4-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 4-1
Typical Electrostatic Voltage Levels

	Relative Humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

✎ A Product can be degraded by as little as 700 volts.

Table 4-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 4-2
Static-Shielding Materials

Material	Use	Voltage Protection Level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

Torx and Phillips screws are removed during disassembly. There are 55 screws, alignment pins, and standoffs, in 13 different sizes, that must be removed, replaced, and/or loosened when servicing the notebook. Make special note of each screw size and location during removal and replacement.

Refer to Appendix C, “Screw Listing,” for detailed information on screw sizes, locations, and usage.

5.1 Serial Number

Report the notebook serial number to HP when requesting information or ordering spare parts. The serial number is located on the bottom of the notebook.

Serial Number Location

5.2 Disassembly Sequence Chart

Use the chart below to determine the section number to be referenced when removing notebook components.

Table 5-1
Disassembly Sequence Chart

Section	Description	# of Screws Removed
5.3	Preparing the notebook for disassembly	
	Battery pack	0
	Hard Drive	1
	Hard drive bezel	6 screws, 2 alignment pins

Table 5-1
Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
5.4	Notebook feet	0
5.5	Memory expansion board	1 loosened
5.6	Mini PCI communications board	1 loosened
5.7	LED switch cover	2
5.8	Keyboard	1
5.9	Fan	3
5.10	Heat sink and fan	2 loosened, 4 removed
5.11	Processor	0
5.12	Display assembly	4
5.13	Top cover	13
5.14	Bluetooth wireless device	0
5.15	TouchPad	2
5.16	RTC battery	0
5.17	Speaker/microphone	2
5.18	Switch board	2
5.19	System board	5 screws, 2 standoffs
5.20	Modem board	2

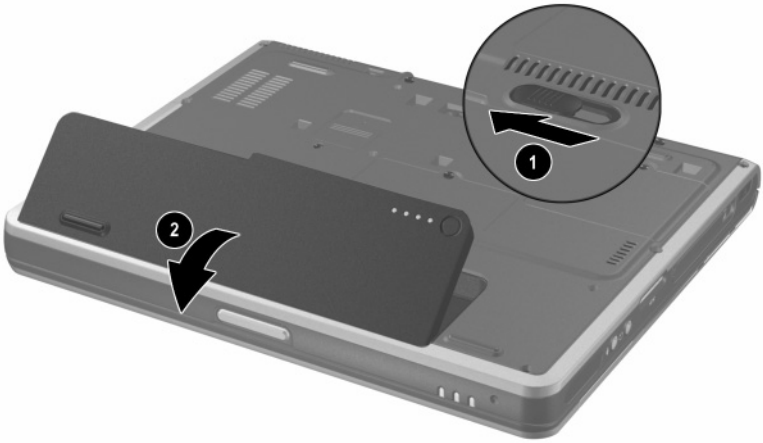
5.3 Preparing the Notebook for Disassembly

Perform the following steps before disassembling the notebook:

1. Turn off the notebook.
2. Disconnect the AC adapter and all external devices.

Battery Pack Spare Part Number Information	
Battery pack, 6 cell, 40 wH	315338-001

3. Remove the battery pack by following these steps:
   a. Turn the notebook bottom side up with the front facing forward.
   b. Slide and hold the battery release latch ❶ to the left. The rear edge of the battery pack releases from the notebook.
   c. Lift the rear edge of the battery pack up and swing it forward ❷.
   d. Remove the battery pack.

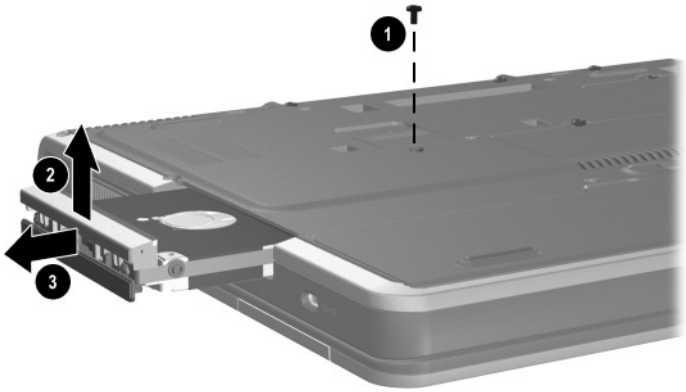


Removing the Battery Pack

Reverse the above procedure to install the battery pack.

Hard Drive Spare Part Number Information	
60 GB	325524-001
40 GB	325523-001
30 GB	325522-001

4. Remove the hard drive by following these steps:
   a. Turn the notebook bottom side up with the left side facing forward.
   b. Remove the PM2.5×3.0 screw ❶ that secures the hard drive to the notebook.
   c. Separate the hard drive bezel ❷.
   d. Use the bezel to slide the hard drive forward ❸ to unseat the hard drive connector from the system board.
   e. Remove the hard drive.



Removing the Hard Drive

Reverse the above procedure to install the hard drive.

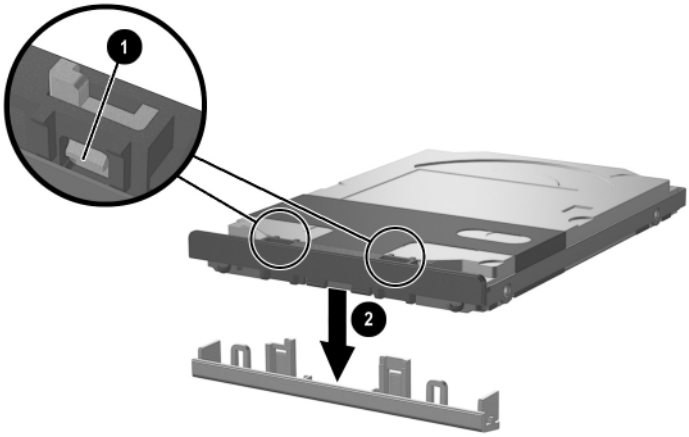
5. Remove the hard drive bezel by following these steps:

CAUTION: The hard drive bezel should only be removed if it is damaged and must be replaced. Unnecessarily removing the hard drive bezel can result in damage to the hard drive bezel and hard drive and loss of information.

The hard drive bezel is included with the hard drive and also in the Miscellaneous Plastics Kit, spare part number 325528-001.

a. Use a flat-bladed tool to press down on the tabs ❶ on the hard drive lower bezel.

b. Remove the lower bezel ❷ from the hard drive upper bezel.

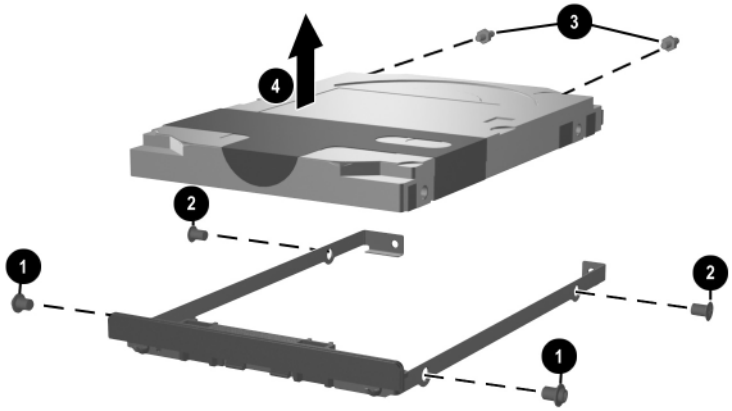


Removing the Hard Drive Lower Bezel

c. Remove the two Torx T5 M2.5×4.5 screws ❶ and the two PM2.5×3.5 screws ❷ that secure the hard drive to the hard drive frame.

d. Use a 4.0-mm socket to remove the two M2.0×10.0 alignment pins ❸ from the back of the hard drive.

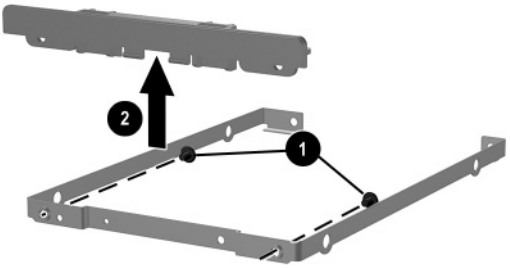
e. Remove the hard drive from the hard drive frame ❹.



Removing the Hard Drive from the Hard Drive Frame

f. Remove the two PM2.0×3.0 screws ❶ that secure the hard drive upper bezel to the hard drive frame.

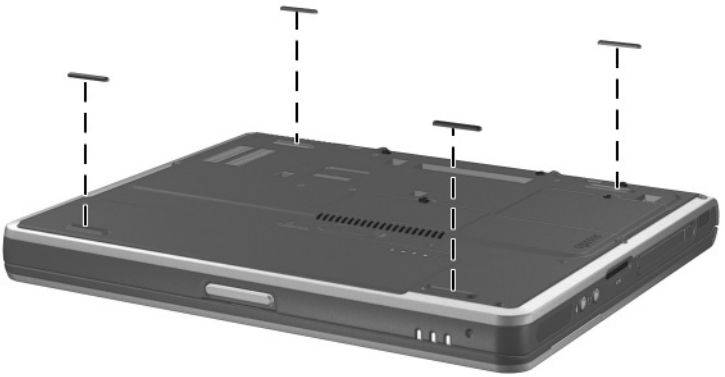
g. Remove the upper bezel from the frame ❷.



Removing the Hard Drive Upper Bezel

5.4 Notebook Feet

The notebook feet are adhesive-backed rubber pads. The notebook feet are included in the Miscellaneous Plastics Kit, spare part number 325528-001. The notebook feet attach to the base enclosure as illustrated below.



Replacing the Notebook Feet

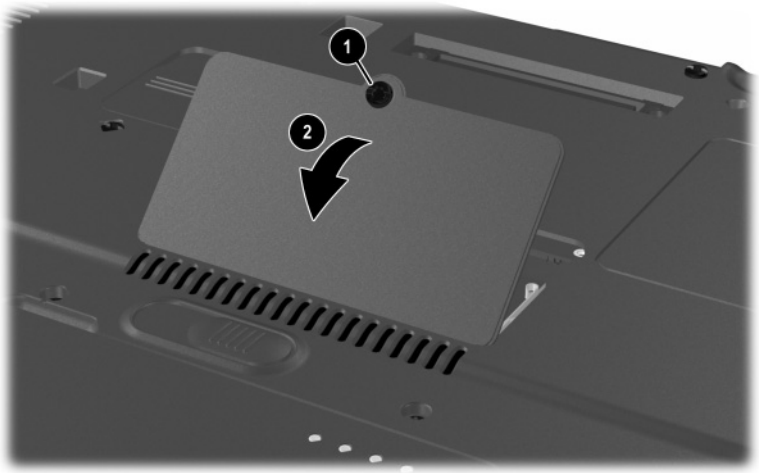
5.5 Memory Expansion Board

Memory Expansion Boards
Spare Part Number Information

512 MB DDR	280875-001
256 MB DDR	280874-001

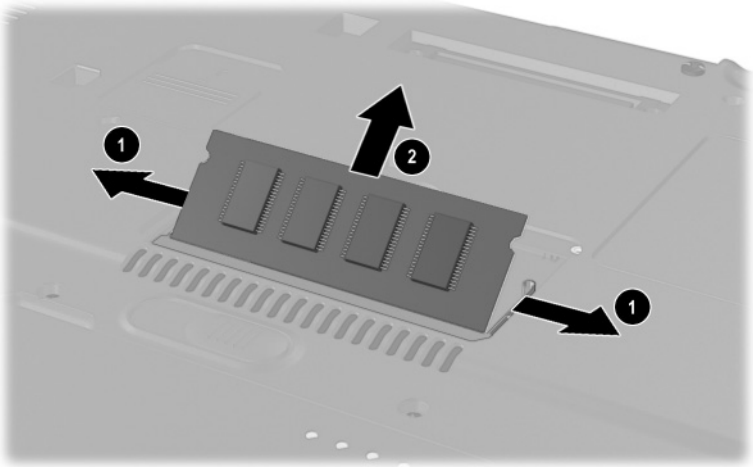
1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook bottom side up with the front facing forward.
3. Loosen the PM2.0×4.0 screw ❶ that secures the memory expansion compartment cover to the notebook.
4. Lift the rear edge of the cover up and swing it forward ❷.
5. Remove the cover.

The memory expansion compartment cover is included in the Miscellaneous Plastics Kit, spare part number 325528-001.



Removing the Memory Expansion Compartment Cover

6. Spread the retaining tabs ❶ that secure the memory expansion board to the socket. The board rises up at a 45-degree angle.
7. Pull the board away from the socket at a 45-degree angle ❷.



Removing a Memory Expansion Board

Reverse the above procedure to install a memory expansion board.

5.6 Mini PCI Communications Board

Mini PCI Communications Boards Spare Part Number Information

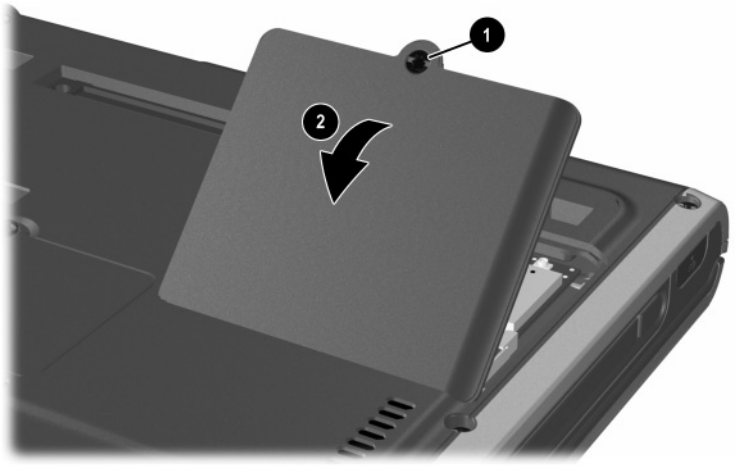
802.11a/b/g wireless LAN board	333782-001
802.11b/g wireless LAN board	333781-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook bottom side up with the front facing forward.
3. Loosen the PM2.0×4.0 screw ❶ that secures the mini PCI compartment cover to the notebook.

The mini PCI compartment cover on notebook models equipped with a 5-GHz wireless communications device is secured by a M2.0×4.0 security screw. This screw can only be removed using a special security driver.

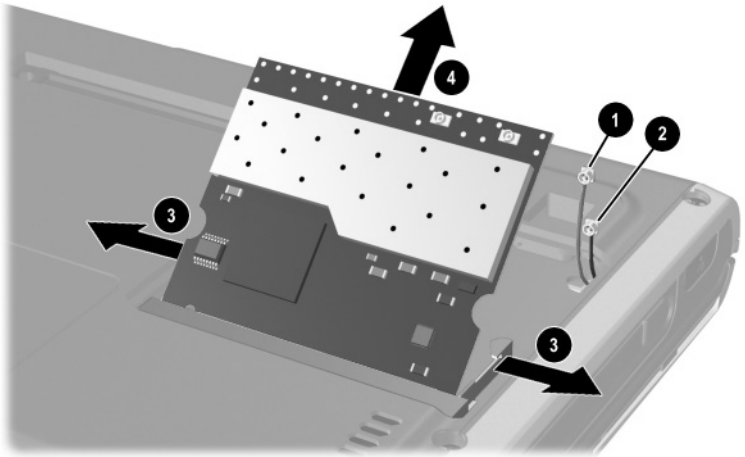
4. Lift the rear edge of the cover up and swing it forward ❷.
5. Remove the cover.

The mini PCI compartment cover is included in the Miscellaneous Plastics Kit, spare part number 325528-001.



Removing the Mini PCI Compartment Cover

6. Disconnect the two antenna cables from the mini PCI communications board. Note that the longer cable ❶ connects to the left socket and the shorter cable ❷ connects to the right socket.
7. Spread the retaining tabs ❸ that secure the mini PCI communications board to the socket. The board rises up at a 45-degree angle.
8. Pull the board away from the socket at a 45-degree angle ❹.



Removing a Mini PCI Communications Board

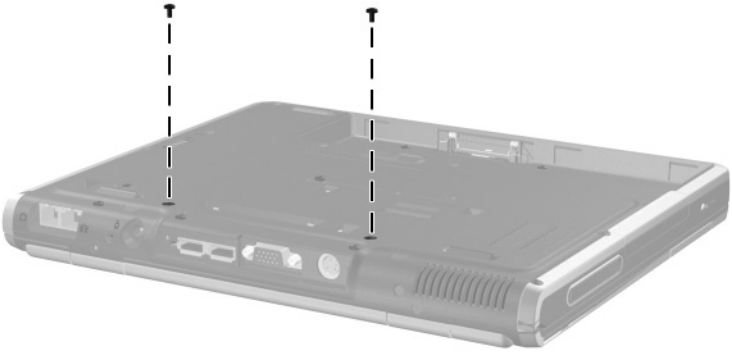
Reverse the above procedure to install a mini PCI communications board.

5.7 LED Switch Cover

LED Switch Cover
Spare Part Number Information

LED switch cover	325512-001

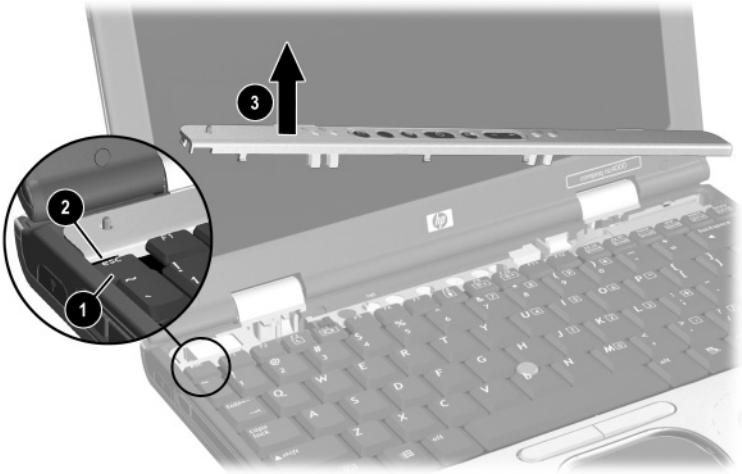
1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook bottom side up with the rear panel facing forward.
3. Remove the two T8M2.0×8.0 screws that secure the LED switch cover to the notebook.



Removing the LED Switch Cover Screws

4. Turn the notebook top side up with the front facing forward.
5. Open the notebook as far as it will open.

6. Press down on the **esc** key ❶ to reveal the notch ❷ in the left side of the LED switch cover.
7. Insert a flat-bladed tool into the notch and lift the left side of the LED switch cover ❸.
8. After the left side of the LED switch cover has disengaged from the notebook, swing the LED switch cover up and to the right.
9. Remove the LED switch cover.



Removing the LED Switch Cover

Reverse the above procedure to install the LED switch cover.

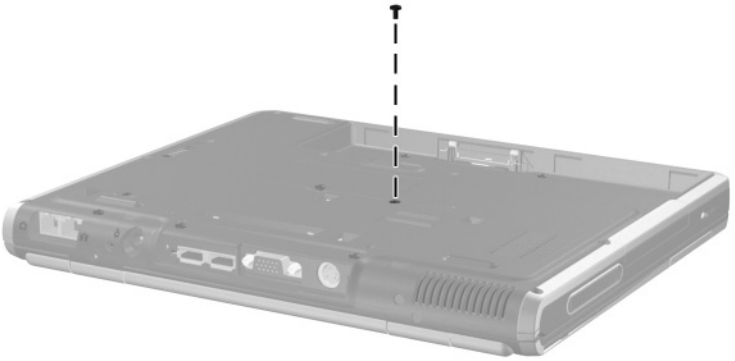
5.8 Keyboard

Keyboards
Spare Part Number Information

Asia Pacific	325530-371	Latin America	325530-161
Australia	325530-011	The Netherlands	325530-331
Brazil	325530-201	Norway	325530-091
Czech Republic	325530-221	People's Republic of China	325530-AA1
Denmark	325530-081	Poland	325530-241
Europe	325530-021	Portugal	325530-131
France	325530-051	Russia	325530-251
French Canada	325530-121	Saudi Arabia	325530-171
Germany	325530-041	Slovakia	325530-231
Greece	325530-151	Spain	325530-071
Hong Kong	325530-AC1	Sweden	325530-101
Hungary	325530-211	Switzerland	325530-111
Iceland	325530-DD1	Taiwan	325530-AB1
India	325530-D61	Thailand	325530-281
International	325530-002	Turkey	325530-141
Israel	325530-BB1	United Kingdom	325530-031
Italy	325530-061	United States	325530-001
Japan	325530-291		
Korea	325530-AD1		

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the LED switch cover (Section 5.7).
3. Close the notebook and turn it bottom side up with the rear panel facing forward.

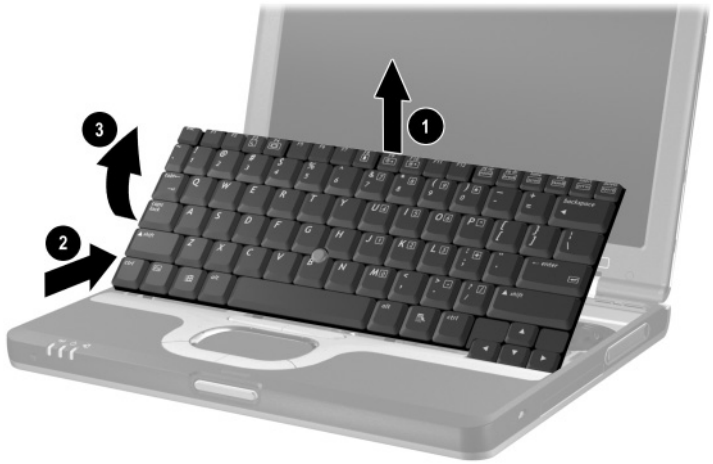
4. Remove the T8M2.0×8.0 screw that secures the keyboard to the notebook.



Removing the Keyboard Screw

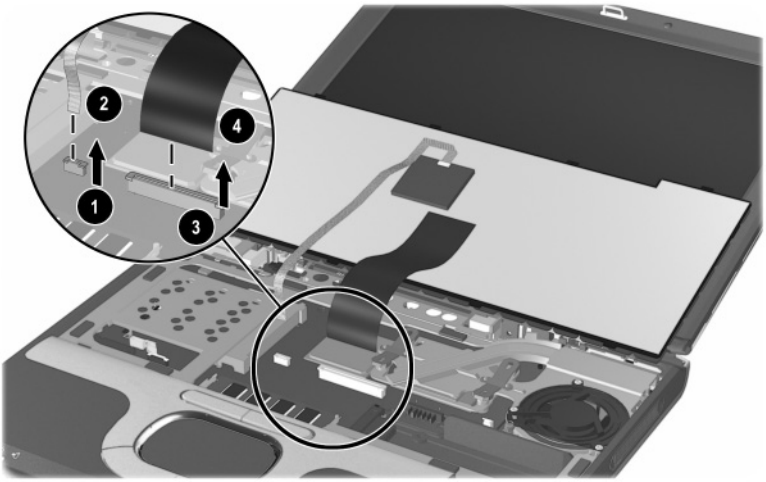
5. Turn the notebook top side up with the front facing forward.
6. Open the notebook as far as it will open.

7. Lift the rear edge of the keyboard ❶.
8. Slide the keyboard toward the display ❷ until the notches on the front edge of the keyboard clear the top cover.
9. Swing the front edge of the keyboard up and back ❸ until it rests on the display.



Releasing the Keyboard

10. Release the zero insertion force (ZIF) connector ❶ to which the pointing stick cable is attached and disconnect the pointing stick cable ❷ from the system board.
11. Release the ZIF connector ❸ to which the keyboard cable is attached and disconnect the keyboard cable ❹ from the system board.



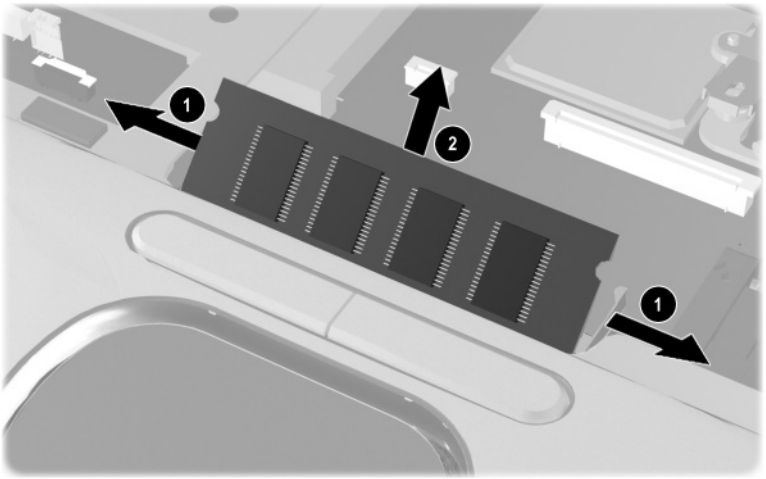
Removing the Keyboard

12. Remove the keyboard.

Reverse the above procedure to install the keyboard.

After the keyboard is removed, the internal memory expansion socket is accessible. Follow these steps to remove a memory expansion board from the internal memory expansion socket:

1. Spread the retaining tabs ❶ that secure the memory expansion board to the socket. The board rises up at a 45-degree angle.
2. Pull the board away from the socket at a 45-degree angle ❷.



Removing an Internal Memory Expansion Board

Reverse the above procedure to install the internal memory expansion board.

5.9 Fan

Fan
Spare Part Number Information

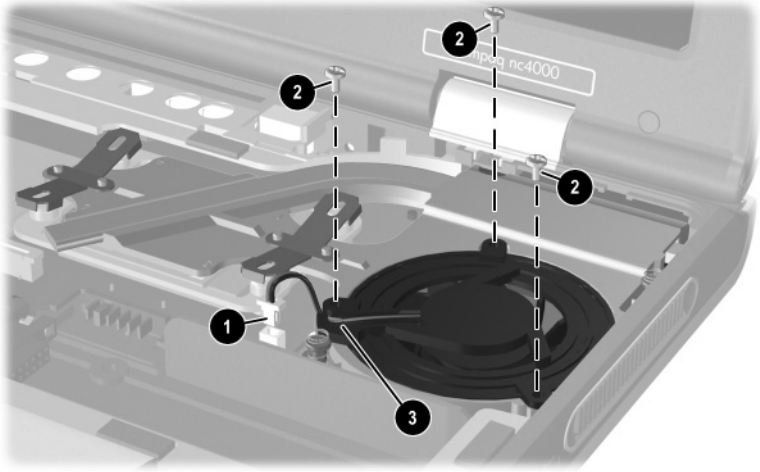
Fan	291266-001

The fan is also spared with the heat sink, spare part number 325520-001.

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the LED switch cover (Section 5.7).
3. Remove the keyboard (Section 5.8).

4. Disconnect the fan cable ❶ from the system board.
5. Remove the three PM2.0×3.0 screws ❷ that secure the fan to the heat sink.
6. Remove the fan.

CAUTION: When installing the fan in the heat sink, make sure the fan cable is not get crimped by the screw next to the cable clip ❸. If the cable is crimped and damaged, the fan will not cool the notebook internal components, which could result in damage.



Removing the Fan

Reverse the above procedure to install the fan.

5.10 Heat Sink

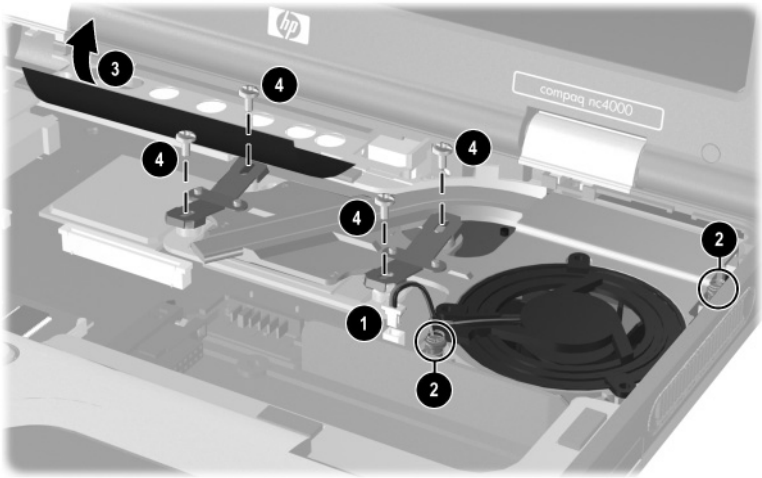
Heat Sink
Spare Part Number Information

Heat sink (includes fan)	325520-001

The fan is also spared seperately, using spare part number 291266-001.

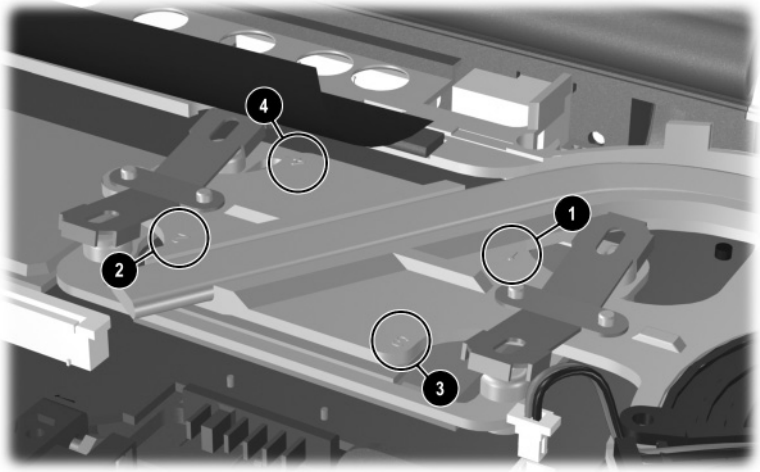
1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the LED switch cover (Section 5.7).
3. Remove the keyboard (Section 5.8).

4. Disconnect the fan cable ❶ from the system board.
5. Loosen the two spring-loaded T8 M2.0×10.0 screws ❷ that secure the heat sink to the base enclosure.
6. Fold back the insulator material ❸ to expose the heat sink screws.
7. Remove the four T8 M2.0×4.0 screws ❹ that secure the heat sink to the base enclosure.



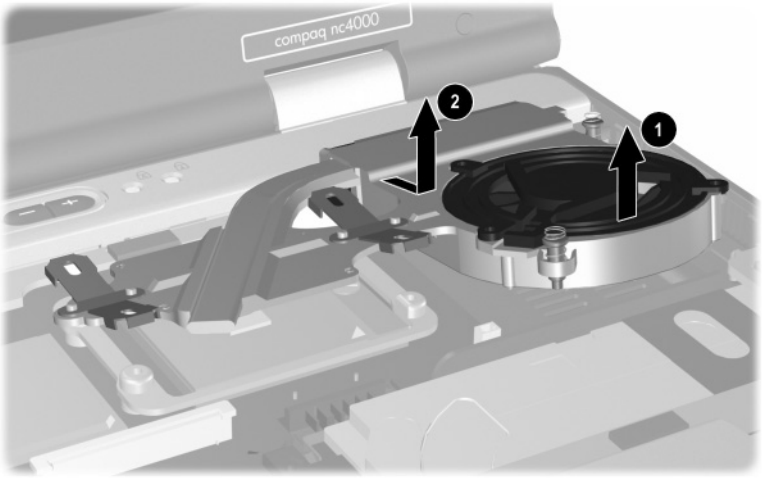
Removing the Heat Sink Screws

Note that the four T8 M2.0×4.0 heat sink screws should be removed and installed in the ❶, ❷, ❸, ❹ sequence stamped on the heat sink.



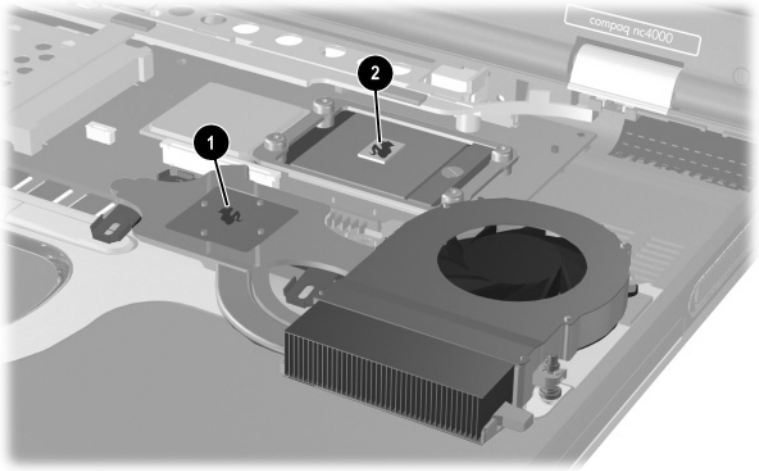
Heat Sink Screw Removal and Installation Sequence

8. Lift the front edge of the heat sink until it clears the base enclosure ❶.
9. Slide the heat sink forward at an angle ❷ and remove it.



Removing the Heat Sink

Each time the heat sink is removed, any thermal grease residue should be carefully cleaned from the heat sink ❶ and processor surfaces ❷, and new thermal grease should be applied to both surfaces.



Removing the Thermal Grease From the Heat Sink and Processor

Reverse the above procedure to install the heat sink and fan.

5.11 Processor

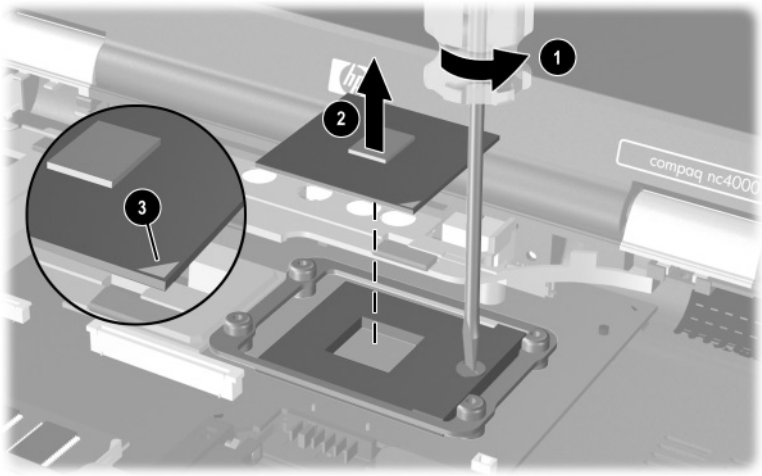
Processor Spare Part Number Information

Intel Pentium-M 1.6 GHz	319777-001
Intel Pentium-M 1.5 GHz	319776-001
Intel Pentium-M 1.4 GHz	319775-001
Intel Pentium-M 1.3 GHz	319774-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the LED switch cover (Section 5.7).
3. Remove the keyboard (Section 5.8).

4. Remove the heat sink and fan (Section 5.10).
5. Use a flat-bladed tool to turn the processor locking screw one-quarter turn counterclockwise ❶.
6. Lift the processor straight up ❷ and remove it.

Note that the gold triangle ❸ should be in the lower right corner when installing the processor.



Removing the Processor

Reverse the above procedure to install the processor.

5.12 Display Assembly

Display Assembly
Spare Part Number Information

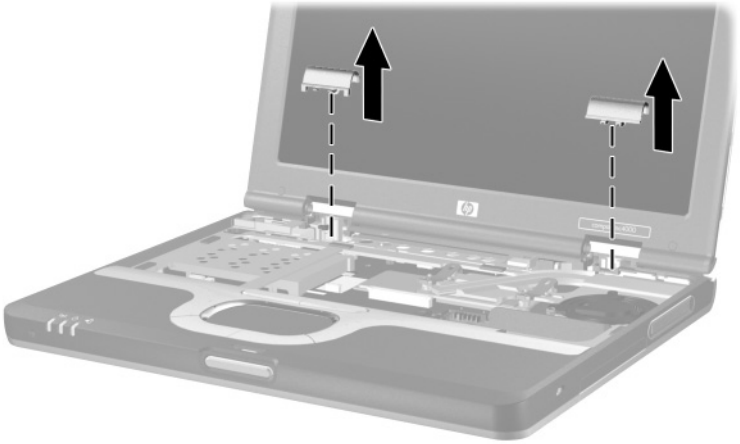
12.1-inch TFT XGA with wireless device antennae	325509-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Disconnect the antenna cables from the mini PCI communications board. Refer to Section 5.6, "Mini PCI Communications Board," for instructions.
3. Remove the LED switch cover (Section 5.7).
4. Remove the keyboard (Section 5.8).
5. Close the notebook and position the notebook so the rear panel faces forward.
6. Remove the two T8M2.0×8.0 screws that secure the hinge covers to the notebook.

Removing the Display Assembly Screws

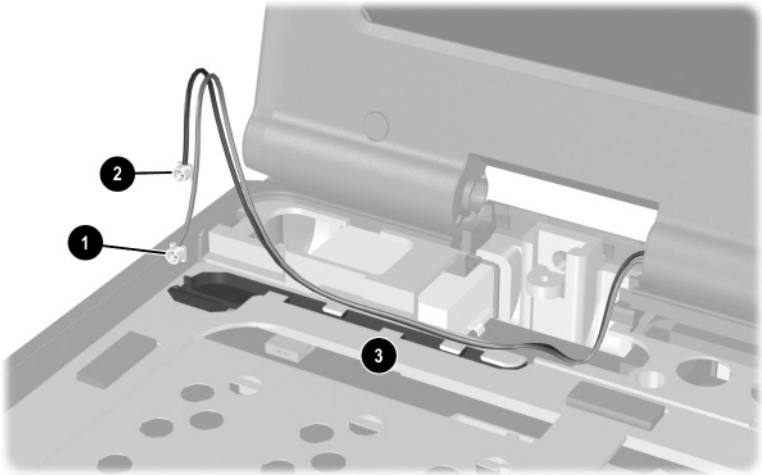
7. Position the notebook so the front faces forward and open the notebook as far as it will open.
8. Remove the display hinge covers by inserting a flat-bladed tool under the covers and lifting them up.

The hinge covers are included in the Miscellaneous Plastics Kit, spare part number 325528-001.



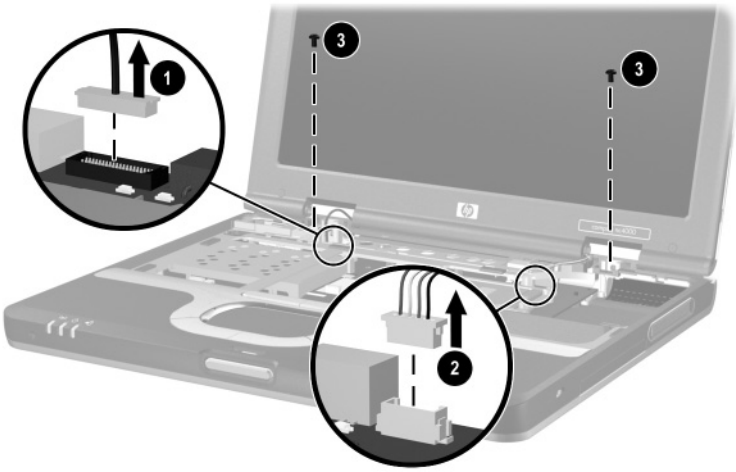
Removing the Hinge Covers

9. Remove the wireless antenna cables ❶ and ❷ from the routing channel in the top cover ❸.



Removing the Antenna Cables

10. Disconnect the display inverter ❶ and video cables ❷ from the system board.
11. Remove the two T8M2.0×8.0 screws ❸ that secure the display assembly to the base enclosure.



Disconnecting the Display Cables and Removing the Display Assembly Screws

12. Lift the display assembly straight up and remove it.

Reverse the above procedure to install the display assembly.

5.13 Top Cover

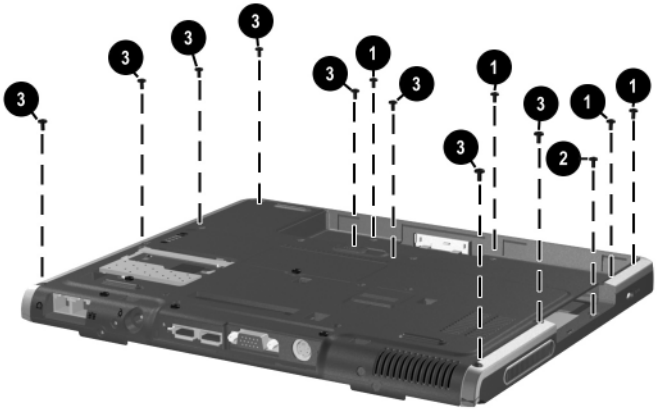
Top Cover
Spare Part Number Information

Top cover (includes TouchPad, speaker/microphone, and RTC battery)	325510-001

When replacing the top cover, determine if a Bluetooth wireless device is installed in the defective top cover. If a Bluetooth wireless device is installed, make sure the device is removed from the defective top cover and installed in the replacement top cover. Refer to Section 5.14, "Bluetooth Wireless Device," for instructions on replacing a Bluetooth wireless device.

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the LED switch cover (Section 5.7).
3. Remove the keyboard (Section 5.8).
4. Remove the display assembly (Section 5.12).
5. Turn the notebook bottom side up with the rear panel facing forward.

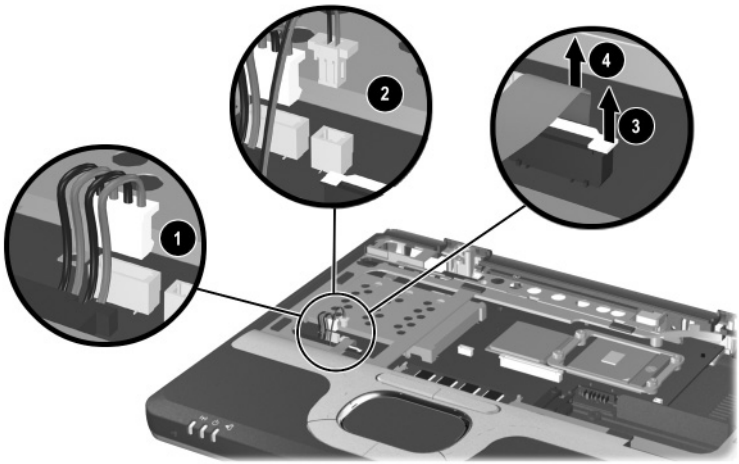
6. Remove the following screws:
   - ❏ Four T8M2.0×4.0 screws ❶ in the battery bay
   - ❏ One T8M2.0×4.0 screw ❷ in the hard drive bay
   - ❏ Eight T8M2.0×8.0 screws ❸



Removing the Top Cover Screws

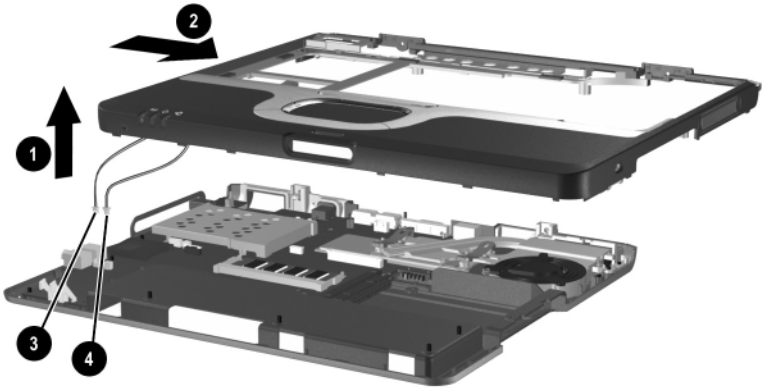
7. Turn the notebook top side up with the front facing forward.

8. If present, disconnect the Bluetooth wireless device cable ❶ from the system board.
9. Disconnect the RTC battery cable ❷ from the system board.
10. Release the ZIF connector ❸ to which the TouchPad cable is connected and disconnect the TouchPad cable ❹ from the system board.



Disconnecting the Top Cover Cables

11. Lift the rear edge ❶ of the top cover until it disengages from the base enclosure.
12. Slide the top cover to the right ❷ until the speaker ❸ and microphone ❹ cables are exposed.
13. Disconnect the speaker and microphone cables from the system board.
14. Remove the top cover.



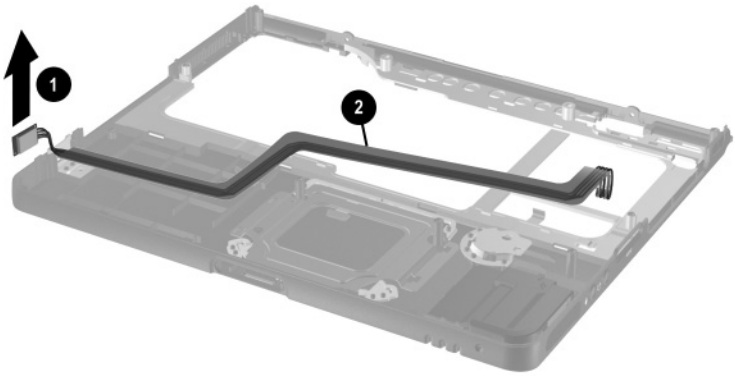
Removing the Top Cover

Reverse the above procedure to install the top cover.

5.14 Bluetooth Wireless Device

Bluetooth Wireless Device Spare Part Number Information	
Bluetooth wireless device	333605-001

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
2. Turn the top cover bottom side up with the TouchPad facing forward.
3. Remove the Bluetooth wireless device from the slot in the top cover ❶ and device cable from the routing channels in the top cover ❷.



Removing the Bluetooth Wireless Device

Reverse the above procedure to install the Bluetooth wireless device.

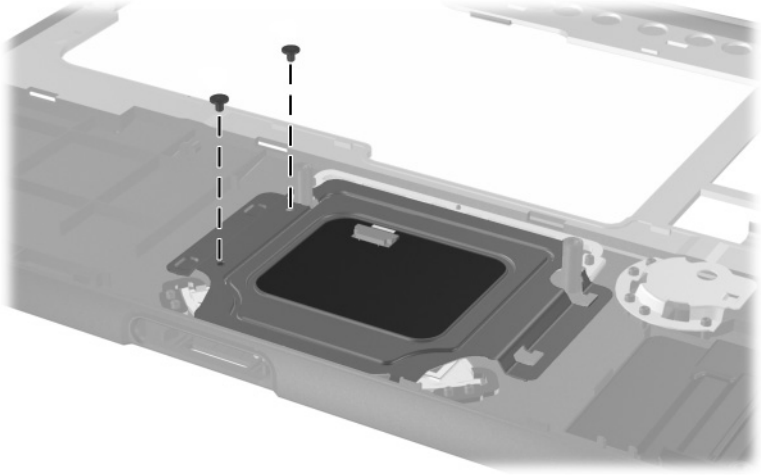
5.15 TouchPad

TouchPad Spare Part Number Information	
TouchPad with cable and bracket	325513-001

The TouchPad is also included in the Miscellaneous Plastics Kit, spare part number 325528-001.

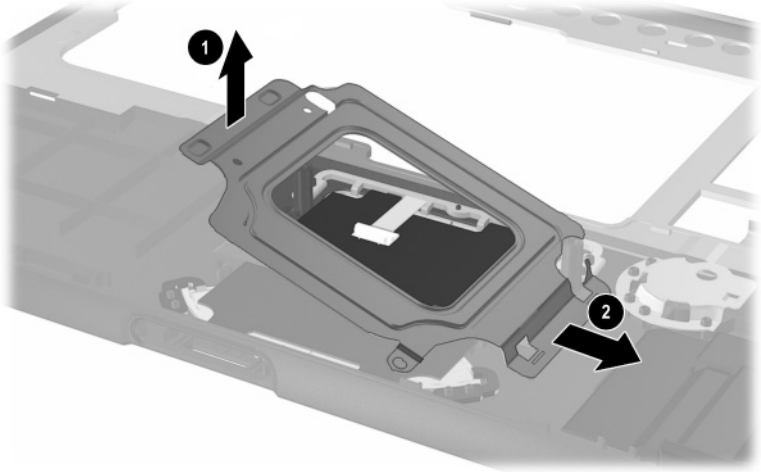
1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
2. Turn the top cover bottom side up with the TouchPad facing forward.

3. Remove the two PM2.0×4.0 screws that secure the TouchPad bracket to the top cover.



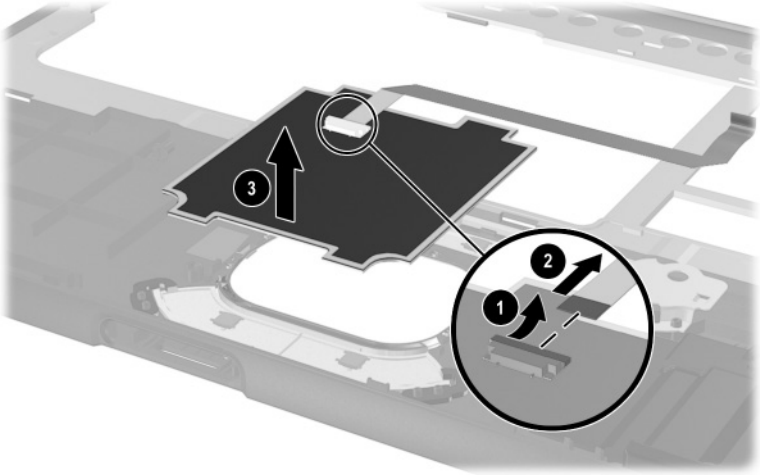
Removing the TouchPad Screws

4. Lift the left side of the bracket ❶ until it rests at an angle.
5. Slide the bracket to the right ❷ and remove it.



Removing the TouchPad Bracket

6. Release the ZIF connector ❶ to which the TouchPad cable is attached and disconnect the cable ❶ from the TouchPad board.
7. Lift the TouchPad straight up and remove it ❸.



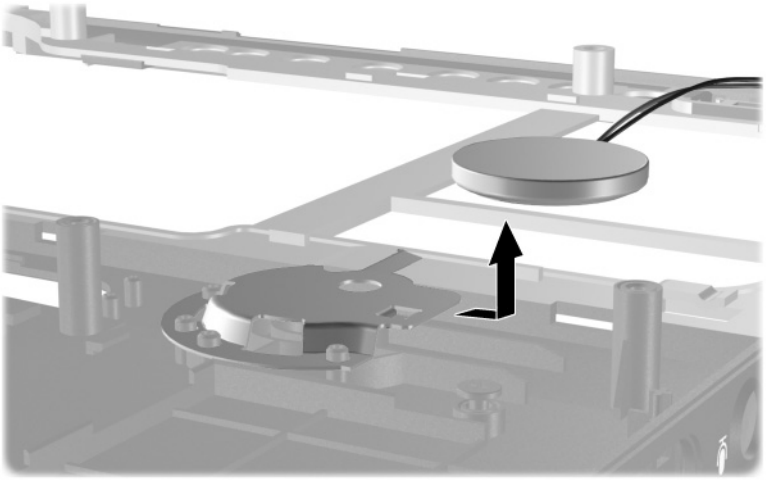
Removing the TouchPad

Reverse the above procedure to install the TouchPad.

5.16 RTC Battery

The RTC battery is included in the Miscellaneous Plastics Kit, spare part number 325528-001, and is also included with the top cover, spare part number 325510-001.

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
2. Turn the top cover bottom side up with the TouchPad facing forward.
3. Slide the RTC battery out of the bracket in the top cover.



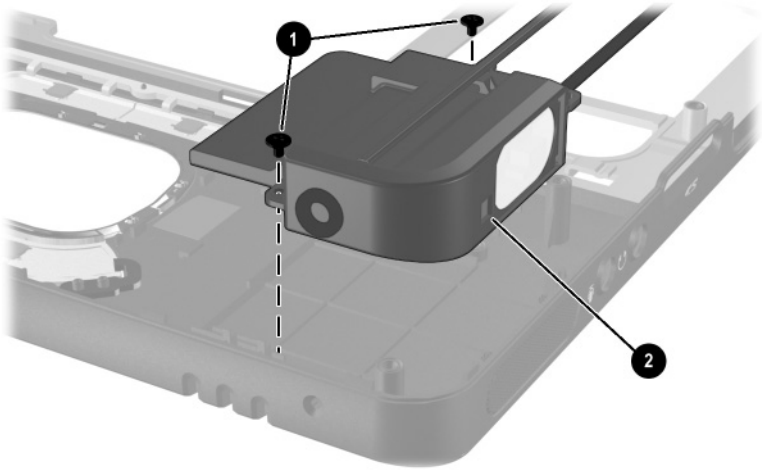
Removing the RTC Battery

Reverse the above procedure to install the RTC battery.

5.17 Speaker/Microphone

The speaker/microphone is included in the Miscellaneous Plastics Kit, spare part number 325528-001, and is also included with the top cover, spare part number 325510-001.

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
2. Turn the top cover bottom side up with the TouchPad facing forward.
3. Remove the two PM2.0×4.0 screws ❶ that secure the speaker/microphone to the top cover.
4. Remove the speaker/microphone ❷ from the top cover.



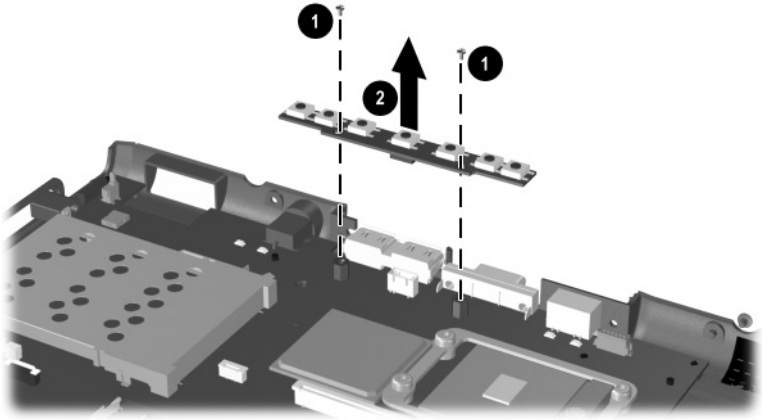
Removing the Speaker/Microphone

Reverse the above procedure to install the speaker/microphone.

5.18 Switch Board

Switch Board Spare Part Number Information	
Switch board	325515-001

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
2. Remove the two PM2.0×3.0 screws ❶ that secure the switch board to the system board.
3. Lift up on the middle of the switch board ❷ to disconnect it from the system board.
4. Remove the switch board.



Removing the Switch Board

Reverse the above procedure to install the switch board.

5.19 System Board

System Board
Spare Part Number Information

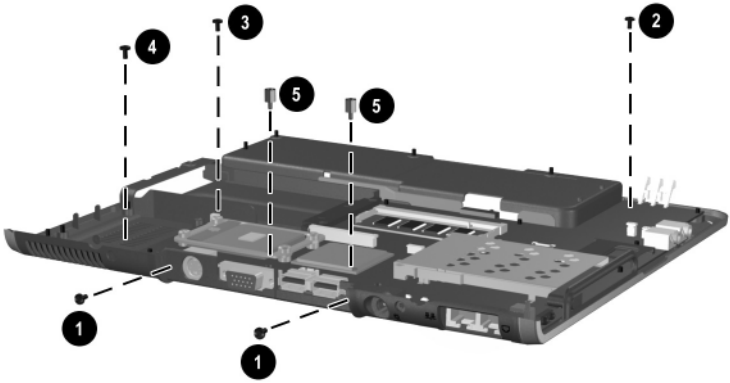
System board	325514-001

When replacing the system board, ensure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory expansion boards (Section 5.5)
- Mini PCI communications board (Section 5.6)
- Processor (Section 5.11)
- Modem and modem cable (Section 5.18)

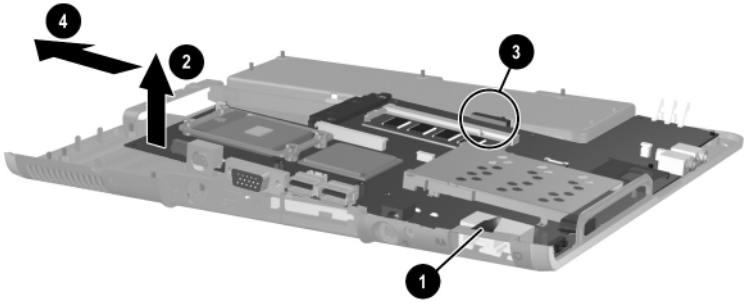
1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Heat sink and fan (Section 5.10)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
   - ❏ Switch board (Section 5.16)
2. Position the base enclosure so the rear panel is facing forward.

3. Remove the following screws:
   - ❏ Two T8M2.0×6.0 screws ❶ from the rear panel
   - ❏ One T8M2.0×4.0 screw ❷ in the upper right corner of the system board
   - ❏ One T8M2.0×4.0 screw ❸ in front of the hard drive bay
   - ❏ One T8M2.0×4.0 screw ❹ in the lower left corner of the system board
4. Use a 5.0-mm socket to remove the two M2.0×9.0 standoffs ❺ that secure the system board to the base enclosure.



Removing the System Board Screws

5. Remove the grounding tape ❶ that grounds the RJ-11 and RJ-45 connectors to the base enclosure.
6. Lift the left side of the system board ❷ until the battery connector ❸ clears the base enclosure.
7. Slide the system board away from the base enclosure at an angle ❹.



Removing the System Board

Reverse the above procedure to install the system board.

5.20 Modem Board

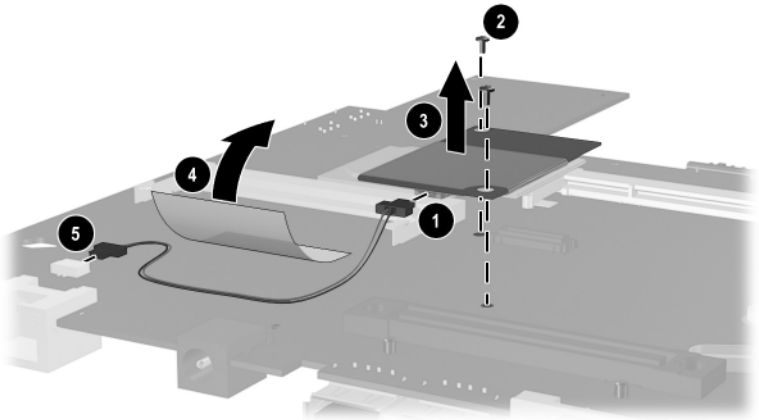
Modem Board
Spare Part Number Information

Modem board, includes modem cable	325521-001

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   - ❏ LED switch cover (Section 5.7)
   - ❏ Keyboard (Section 5.8)
   - ❏ Heat sink and fan (Section 5.10)
   - ❏ Display assembly (Section 5.12)
   - ❏ Top cover (Section 5.13)
   - ❏ Switch board (Section 5.16)
   - ❏ System board (Section 5.19)
2. Turn the system board bottom side up with the rear panel facing forward.

3. Disconnect the modem board cable ❶ from the modem board.
4. Remove the two PM2.0×3.0 screws ❷ that secure the modem board to the system board.
5. Lift the rear edge of the modem board ❸ to disconnect it from the system board.
6. Remove the modem board.
7. If the modem board cable must be replaced, remove the tape ❹ that secures the cable to the system board and disconnect the cable ❺ from the system board.

The modem cable is included with the modem board and is also included in the Miscellaneous Plastics Kit, spare part number 325528-001.



Removing the Modem Board

Reverse the above procedure to install the modem board.

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1
Notebook

Dimensions		
Height	2.79 cm	1.1 in.
Width	27.94 cm	11.0 in.
Depth	23.37 cm	9.2 in.
Weight (varies by configuration)		
	1.58 kg	3.5 lbs
Stand-alone power requirements		
Nominal operating voltage	14.8 VDC	
Maximum operating power	40.0 W	
Peak operating power	50.0 W	
Power in Standby mode	< 800 mW	
Power in Hibernation mode	< 100 mW	
Temperature		
Operating	10° to 35° C	50° to 95° F
Nonoperating	-20° to 60° C	-4° to 140° F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%, 38.7° C (101.6° F) maximum wet bulb temperature	

Table 6-1
Notebook *(Continued)*

Altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	0 to 3,048 m	0 to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	0 to 9,144 m	0 to 30,000 ft
Shock		
Operating	40 G, 2 ms, half-sine	
Nonoperating	240 G, 11 ms, half-sine	
Vibration		
Operating	0.5 G zero-to-peak, 10 to 500 Hz, 0.5 oct/min sweep rate	
Nonoperating	1.0 G zero-to-peak, 10 to 500 Hz, 0.5 oct/min sweep rate	

✎ Applicable product safety standards specify thermal limits for plastic surfaces. The notebook operates well within this range of temperatures.

Table 6-2
12.1.0-inch XGA, TFT Display

Dimensions		
Height	26.1 cm	10.3 in
Width	19.9 cm	7.8 in
Diagonal	30.7 cm	12.1 in
Number of colors	up to 16.8 million	
Contrast ratio	125:1	
Refresh rate	60 Hz	
Brightness	130 nit typical AC only (115 nit minimum); 70 nit on battery	
Pixel resolution		
Pitch	0.264 × 0.264 mm	
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	CCFT	
Character display	80 × 25	
Total power consumption	4.00 W	
Viewing angle	+/- 35° horizontal, +15°/-35° vertical typical	

Table 6-3
Hard Drives

	60 GB	40 GB	30 GB
User capacity per drive[1]	60 GB	40 GB	30 GB
Dimensions			
Height	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm
Weight	99 gm	99 gm	99 gm
Interface type	ATA-5	ATA-5	ATA-5
Transfer rate			
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA	ATA	ATA
Seek times (typical read, including setting)			
Single track	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms
Logical blocks[2]	117,210,240	78,140,160	58,605,120
Disk rotational speed	5400 rpm	5400 rpm	4200 rpm
Operating temperature	5° to 55° C (41° to 131° F)	5° to 55° C (41° to 131° F)	5° to 55° C (41° to 131° F)

[1] 1 GB = 1,073,741,824 bytes.

[2] Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.

Table 6-4
External AC Adapter

Weight	0.29 kg	0.65 lb
Power supply		
Operating voltage	90 to 264 VAC (auto-switching)	
Operating current	1.6 A RMS	
Operating frequency range	47 to 63 Hx AC	
Maximum transient	4/50 kV	

Table 6-5
6-cell, Primary Li ion Battery Pack

Dimensions		
Height	2.3 cm	0.90 in
Width	6.3 cm	2.48 in
Depth	20.7 cm	8.15 in
Weight	281 g	0.62 lb
Energy		
Voltage	11.1 V	
Amp-hour capacity	3.96 aH	
Watt-hour capacity	40 wH	
Temperature		
Operating	5 to 45° C	41 to 113° F
Nonoperating	-20 to 60° C	-4 to 104° F
Recharge time		
System off or in Standby mode	2 to 3 hours	
System on (depending on system power consumption)	2 to 5 hours	

Table 6-6
6-cell, Travel Li ion Battery Pack

Dimensions		
Height	2.3 cm	0.90 in
Width	6.3 cm	2.48 in
Depth	20.7 cm	8.15 in
Weight	306 g	0.67 lb
Energy		
Voltage	11.1 V	
Amp-hour capacity	3.96 aH	
Watt-hour capacity	40 wH	
Temperature		
Operating	5 to 45° C	41 to 113° F
Nonoperating	-20 to 60° C	-4 to 104° F
Recharge time		
System off or in Standby mode	2 to 3 hours	
System on (depending on system power consumption)	2 to 5 hours	

Table 6-7
System DMA

Hardware DMA	System Function
DMA0	Available for audio
DMA1*	Entertainment audio (default; alternate = DMA0, DMA3, none)
DMA2*	Diskette drive
DMA3	ECP parallel port LPT1 (default; alternate = DMA0, none)
DMA4	DMA controller cascading (not available)
DMA5*	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned

*PC Card controller can use DMA 1, 2, or 5.

Table 6-8
System Interrupts

Hardware IRQ	System Function
IRQ0	System timer
IRQ1	Keyboard controller
IRQ2	Cascaded
IRQ3	COM2
IRQ4	COM1
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel port
IRQ8	RTC
IRQ9	Infrared
IRQ10	System use
IRQ11	System use
IRQ12	Internal point stick or external mouse
IRQ13	Coprocessor (not available to any peripheral)
IRQ14	IDE interface (hard drive and optical drive)
IRQ15	System use
✎	PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.

*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.

Table 6-9
System I/O Addresses

I/O Address (hex)	**System Function** (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 “Super I/O” configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/RTC
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2

Table 6-9
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
201	Joystick (decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port

Table 6-9
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer—OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	PC Card controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	“A” diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

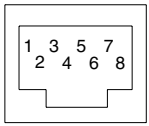
Table 6-10
System Memory Map

Size	Memory Address	System Function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	01000000-047FFFFF	Super extended memory
58 MB	04800000-07FFFFFF	Unused
2 MB	08000000-080FFFFF	Video memory (direct access)
4 GB	08200000-FFFEFFFF	Unused
64 KB	FFFF0000-FFFFFFFF	System BIOS

A

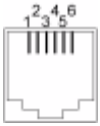
Connector Pin Assignments

Table A-1
RJ-45 Network Interface



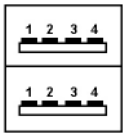
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit –	6	Receive –
3	Receive +	7	Unused
4	Unused	8	Unused

Table A-2
RJ-11 Modem



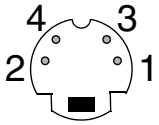
Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-3
Universal Serial Bus



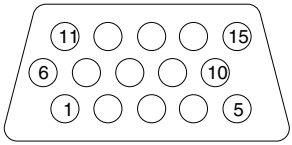
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data –	4	Ground

Table A-4
S-Video



Pin	Signal	Pin	Signal
1	Ground (Y)	3	Y-Luminance (Intensity)
2	Ground (C)	4	C-Chrominance (Color)

Table A-5
External Monitor



Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC 2B clock
8	Ground analog		

Table A-6
Stereo Speaker/Headphone

Pin	Signal	Pin	Signal
1	Audio out	2	Ground

Table A-7
Microphone

Pin	Signal	Pin	Signal
1	Audio in	2	Ground

B

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the notebook permits it to operate from any line voltage from 100 to 120 or 220 to 240 volts AC.

The power cord set received with the notebook meets the requirements for use in the country where the equipment is purchased.

Power cord sets for use in other countries must meet the requirements of the country where the notebook is used. For more information on power cord set requirements, contact an HP authorized reseller or service provider.

General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord set must be at least 5.00 feet (1.5 m) and a maximum of 6.50 feet (2.0 m).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
- The power cord set must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the notebook.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country	Accredited Agency	Applicable Note Number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1

3-Conductor Power Cord Set Requirements

Country	Accredited Agency	Applicable Note Number
United Kingdom	BSI	1
United States	UL	2

Notes

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

C

Screw Listing

This appendix provides specification and reference information for the screws used in the notebook. All screws listed in this appendix are available in the Miscellaneous Screw Kit, spare part number 325529-001.

Table C-1
Phillips PM2.5×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	1	3.0 mm	2.5 mm	5.0 mm

Where used:
One screw that secures the hard drive to the notebook (documented in Section 5.3)

Phillips M2.5×3.0 Screw Location

Table C-2
Torx T5 M2.5×4.5 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	4.5 mm	2.5 mm	5.0 mm

Where used:

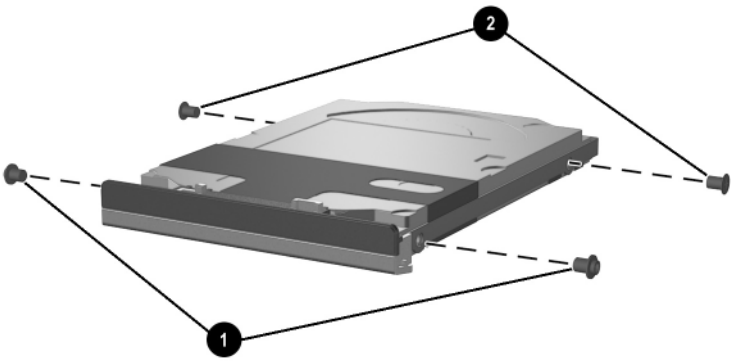
❶ Two screws that secure the hard drive to the hard drive frame (documented in Section 5.3)

Table C-3
Phillips PM2.5×3.5 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	3.5 mm	2.5 mm	4.5 mm

Where used:

❷ Two screws that secure the hard drive to the hard drive frame (documented in Section 5.3)

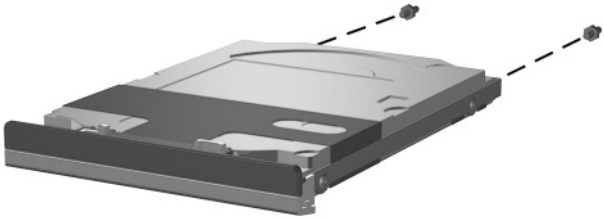


Torx T5 M2.5×4.5 and Phillips M2.5×3.5 Screw Locations

Table C-4
4.0-mm Socket M2.0×10.0 Alignment Pin

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	10.0 mm	2.0 mm	4.0 mm

Where used:
Two alignment pins that secure the hard drive to the hard drive frame (documented in Section 5.3)

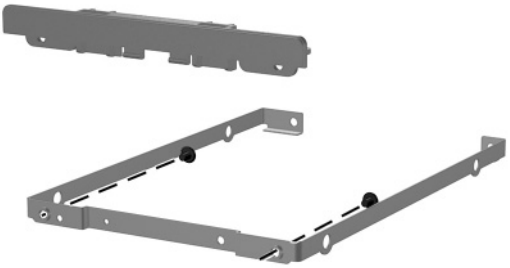


4.0-mm Socket M2.0×10.0 Alignment Pin Locations

Table C-5
Black Phillips PM2.0×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	2	3.0 mm	2.0 mm	4.5 mm

Where used:
Two screws that secure the hard drive upper bezel to the hard drive frame (documented in Section 5.3)



Phillips PM2.0×3.0 Screw Locations

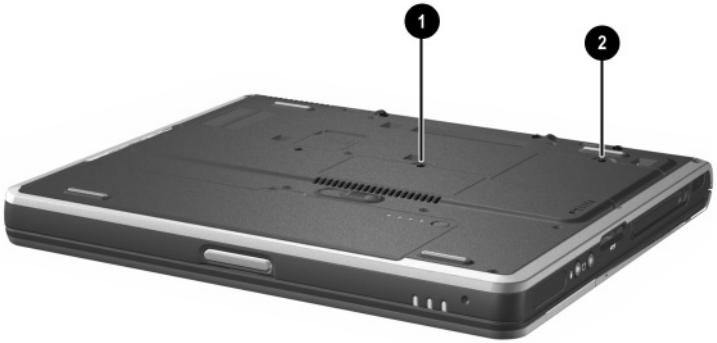
Table C-6
Phillips PM2.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	4.0 mm	2.0 mm	5.0 mm

Where used:

❶ One screw that secures the memory expansion compartment cover to the notebook (documented in Section 5.5)

❷ One screw that secures the mini PCI compartment cover to the notebook (documented in Section 5.6)

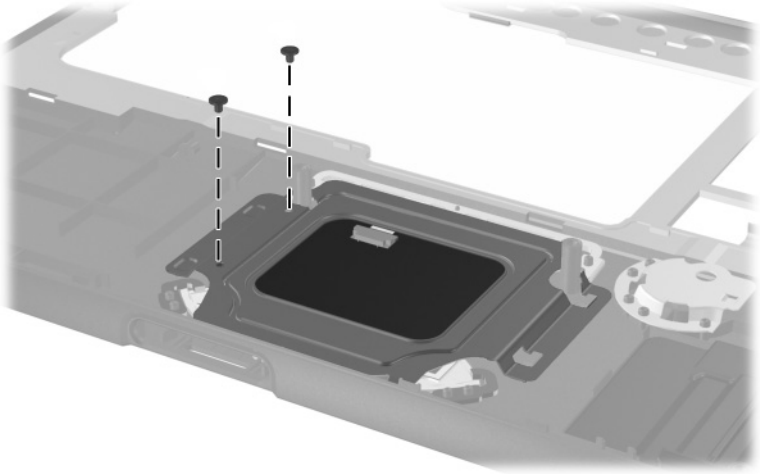


Phillips M2.0×4.0 Screw Locations

Table C-6
Phillips PM2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	4.0 mm	2.0 mm	4.5 mm

Where used:
Two screws that secure the TouchPad to the top cover (documented in Section 5.15)

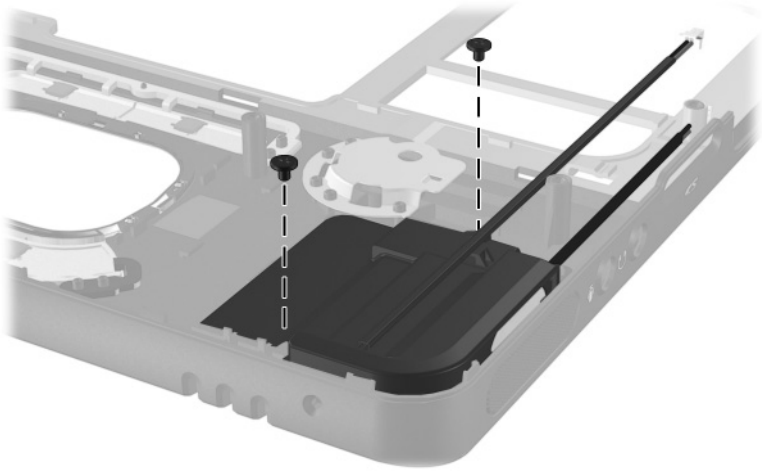


Phillips PM2.0×4.0 Screw Locations

Table C-6
Phillips PM2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	4.0 mm	2.0 mm	4.5 mm

Where used:
Two screws that secure the speaker/microphone to the top cover (documented in Section 5.17)



Phillips PM2.0×4.0 Screw Locations

Table C-7
M2.0×4.0 Security Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	1	4.0 mm	2.0 mm	5.0 mm

Where used:

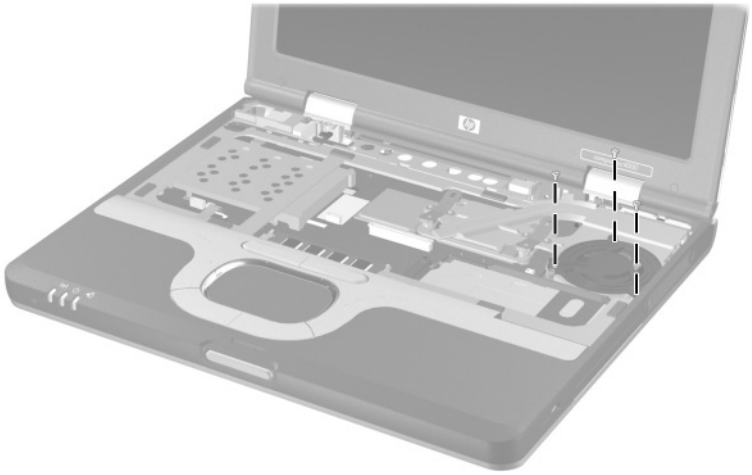
One screw that secures the mini PCI compartment cover to the notebook on models equipped with a 5-GHz wireless LAN board (documented in Section 5.6)

M2.0×4.0 Security Screw Location

Table C-8
Silver Phillips PM2.0×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	7	3.0 mm	2.0 mm	4.0 mm

Where used:
Three screws that secure the fan to the heat sink (documented in Section 5.9)

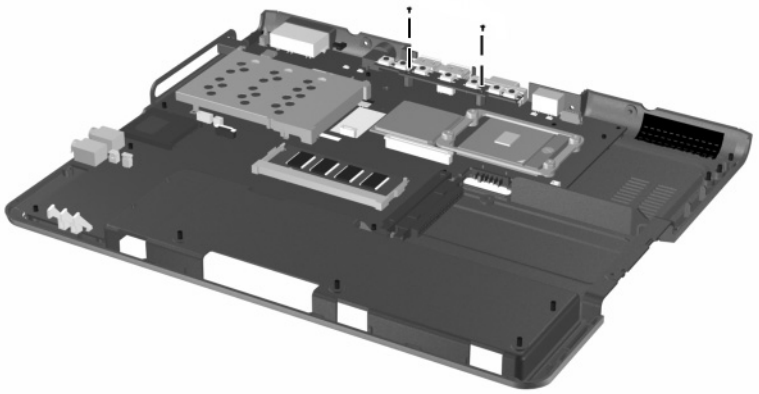


Phillips PM2.0×3.0 Screw Locations

Table C-8
Silver Phillips PM2.0×3.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	7	3.0 mm	2.0 mm	4.0 mm

Where used:
Two screws that secure the switch board to the system board (documented in Section 5.18)

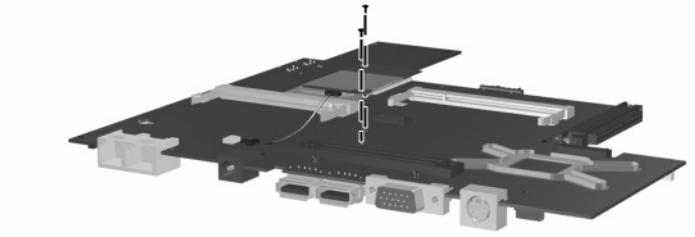


Phillips PM2.0×3.0 Screw Locations

Table C-8
Silver Phillips PM2.0×3.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	7	3.0 mm	2.0 mm	4.0 mm

Where used:
Two screws that secure the modem board to the system board (documented in Section 5.20)



Phillips PM2.0×3.0 Screw Locations

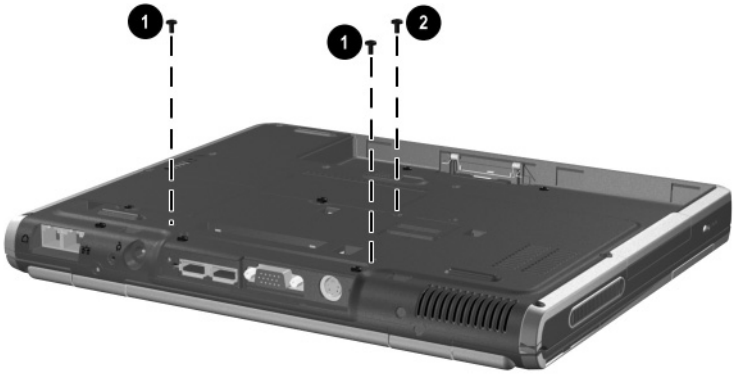
Table C-9
Torx T8 M2.0×8.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	15	8.0 mm	2.0 mm	4.5 mm

Where used:

❶ Two screws that secure the LED switch cover to the notebook (documented in Section 5.7)

❷ One screw that secures the keyboard to the notebook (documented in Section 5.8)



Torx T8 M2.0×8.0 Screw Locations

Table C-9
Torx T8 M2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	15	8.0 mm	2.0 mm	4.5 mm

Where used:
Two screws that secure the display hinge covers to the notebook (documented in Section 5.12)

Torx T8 M2.0×8.0 Screw Locations

Table C-9
Torx T8 M2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	15	8.0 mm	2.0 mm	4.5 mm

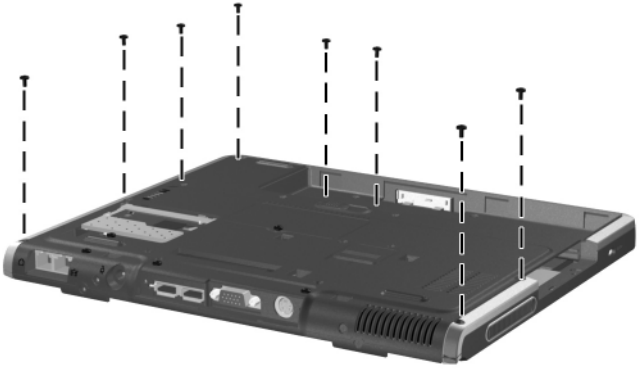
Where used:
Two screws that secure the display assembly to the notebook (documented in Section 5.12)

Torx T8 M2.0×8.0 Screw Locations

Table C-9
Torx T8 M2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	15	8.0 mm	2.0 mm	4.5 mm

Where used:
Eight screws that secure the top cover to the notebook (documented in Section 5.13)

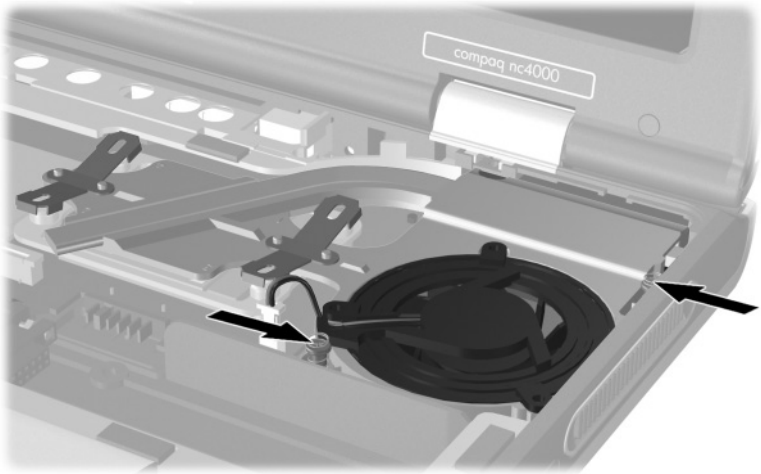


Torx T8 M2.0×8.0 Screw Locations

Table C-10
Spring-Loaded Torx T8 M2.0×10.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	10.0 mm	2.0 mm	5.0 mm

Where used:
Two screws that secure the heat sink to the notebook (documented in Section 5.10; screws and springs secured to heat sink by c-clip)

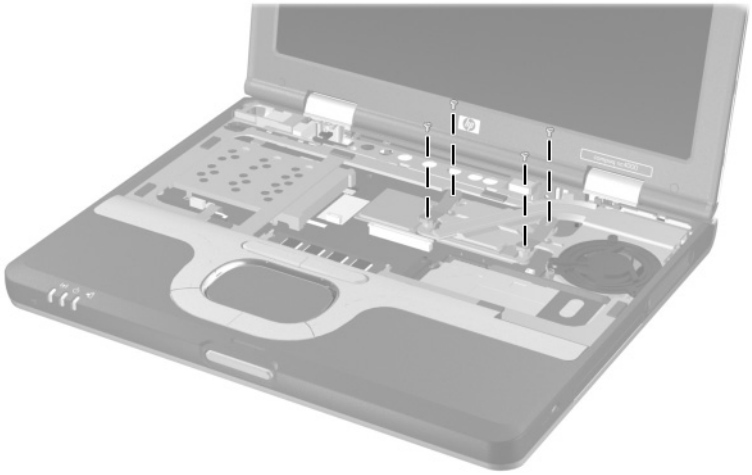


Spring-Loaded Torx T8 M2.0×10.0 Screw Locations

Table C-11
Torx T8 M2.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	12	4.0 mm	2.0 mm	4.5 mm

Where used:
Four screws that secure the heat sink to the notebook (documented in Section 5.10)

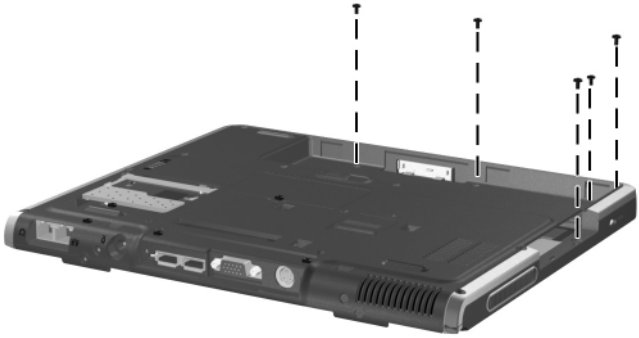


Torx T8 M2.0×4.0 Screw Locations

Table C-11
Torx T8 M2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	12	4.0 mm	2.0 mm	4.5 mm

Where used:
Five screws that secure the top cover to the notebook (documented in Section 5.13)

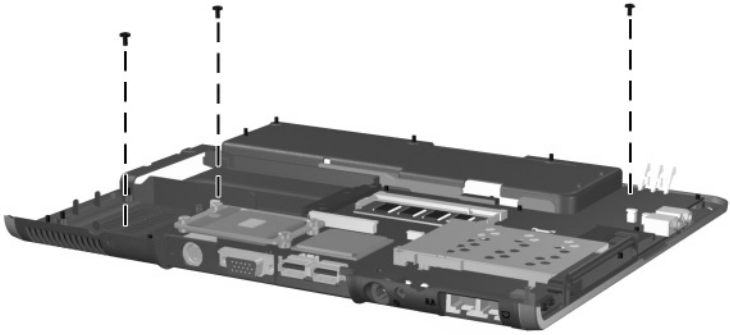


Torx T8 M2.0×4.0 Screw Locations

Table C-11
Torx T8 M2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	12	4.0 mm	2.0 mm	4.5 mm

Where used:
Three screws that secure the system board to the notebook (documented in Section 5.19)

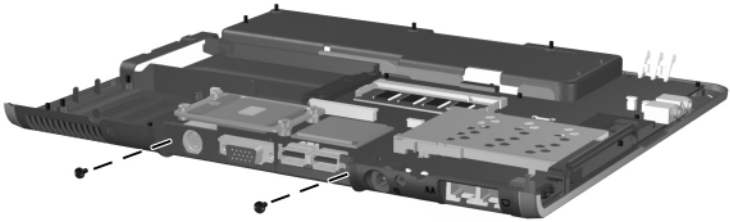


Torx T8 M2.0×4.0 Screw Locations

Table C-12
Torx T8 M2.0×6.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	2	6.0 mm	2.0 mm	4.5 mm

Where used:
Two screws that secure the system board to the notebook (documented in Section 5.19)

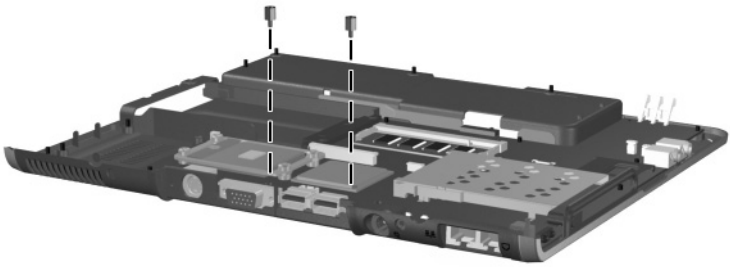


Torx T8 M2.0×6.0 Screw Locations

Table C-13
5.0-mm Socket M2.0×9.0 Standoff

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	9.0 mm	2.0 mm	5.0 mm

Where used:
Two standoffs that secure the system board to the base enclosure (documented in Section 5.19)



5.0-mm Socket M2.0×9.0 Standoff Locations

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